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FEEDING HABITS AND FOOD OF THE FISHES OF MISSISSIPPI SOUND AND ADJACENT COASTAL AREAS; A BIBLIOGRAPHY WITH ABSTRACTS

by

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Final Report

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This document presents bibliographic material relevant to fish feeding habits in the Mississippi Sound and adjacent areas. This bibliography is comprised of 33 references with abstracts or annotations which contain information on Predator-Prey interactions and feeding strategies related to life history parameters.			

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PREFACE

This document was prepared for the Mississippi Sound and Adjacent Areas Study conducted in part by the U. S. Army Engineer Waterways Experiment Station (WES) for the U. S. Army Engineer District, Mobile. WES activities in the project were authorized by Intra-Army Order No. FC-81-0020 dated 25 November 1980.

This bibliographic document together with a companion bibliography comprise the preliminary products of an investigation to describe the ecological role of the invertebrate macrobenthos of Mississippi Sound and adjacent coastal habitats. The results of the study will be used for planning dredging and dredged material disposal operations in the Mobile District.

This document was prepared by Dr. Douglas G. Clarke and Mr. Harry L. Horstmann, Environmental Systems Division (ESD), Environmental Laboratory (EL), WES. Dr. Andrew C. Miller, ESD, assisted with computer software development. Work progressed under the general supervision of Dr. Thomas D. Wright, Chief, Waterways Habitat and Monitoring Group, ESD, EL; Mr. Bob O. Benn, Chief, ESD; and Dr. John Harrison, Chief, EL.

COL Nelson P. Conover, CE, and COL Tilford C. Creel, CE, were Commanders and Directors of WES during the conduct of this work. Technical Director was Mr. Fred R. Brown.

This report should be cited as follows:

Clarke, D. G., and Horstmann, H. L. 1981. "Feeding Habits and Food of the Fishes of Mississippi Sound and Adjacent Coastal Areas; A Bibliography with Abstracts," Miscellaneous Paper EL-81-11, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

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FEEDING HABITS AND FOOD OF THE FISHES OF MISSISSIPPI
SOUND AND ADJACENT COASTAL AREAS;
A BIBLIOGRAPHY WITH ABSTRACTS

1. This document presents bibliographic material relevant to studies of trophic interrelationships within ichthyofaunal communities of Mississippi Sound and its adjacent coastal areas. A very limited amount of research has been conducted on food habits of fishes in the subject areas. The bibliography, therefore, consists largely of references which describe studies in other geographical areas. An attempt was made by the bibliography's compilers to include pertinent references on taxa closely related to the subject ichthyofauna and on similar estuarine and continental shelf systems. A number of the 83 references listed herein deal with specialized topics such as: (a) effects of fish predation on benthos, (b) feeding strategies as related to life history parameters, and (c) effects of competition of food habits.

2. Most citations are accompanied by the complete author abstracts. Where the limitations in capacity of the computerized information handling and printing system used to produce this document precluded inclusion of an entire abstract, the abstract was truncated. Papers which contained no abstracts or appropriate summary sections were annotated. Annotations and truncated abstracts are indicated by an asterisk at the end of the citation.

3. The bibliographic material presented herein is not intended to be a comprehensive treatment of the literature on trophic interrelationships of fishes. Rather, it is a supplemental updating of the literature on this topic as it pertains to Mississippi Sound and adjacent areas. Users should consult the sources listed below for more generalized literature reviews. A number of the references cited in these sources are included herein to facilitate searches by workers interested solely in the topic of fish food habits.

Christmas, J. Y. and R. S. Waller. 1973. "Estuarine Vertebrates, Mississippi," in J. W. Christmas (ed.), Cooperative Gulf of Mexico Estuarine Inventory and Study, Mississippi, Phase IV, Biology, pp 320-406, Gulf Coast Research Laboratory, Ocean Springs, Miss.

Swingle, H. W. 1971. "Biology of Alabama Estuarine Areas--Cooperative Gulf of Mexico Estuarine Inventory," Ala. Mar. Res. Bull., 5:1-123.

U. S. Army Corps of Engineers Contract Report. 1978. "Literature Review of Mississippi Sound and Adjacent Area," Mobile District, CE, Contract No. DACW1-78-C-0244, 251 pp.

4. This report and a companion bibliography on macrobenthic communities (with emphasis on animal-substrate interactions and secondary production) are products of a study that will analyze the trophic support potential of Mississippi Sound and adjacent areas' benthic infaunal communities for demersal bottom-feeding fishes. The results of these analyses will be the substance of a future report.

ALTON, M.S. NO. 81
 1973. BERING SEA BENTHOS AS A FOOD RESOURCE FOR DEMERSAL FISH POPULATION
 HOOD&KELLY(EDS) OCEANOGRAPHY OF THE BERING SEA: 257-277
 UNIV ALASKA, INST MAR SCI FAIRBANKS, AK

CERTAIN BENTHIC ANIMALS SUCH AS THE TANNER AND KING CRABS, PANDALID SHRIMP AND MOLLUSKS ARE OF DIRECT IMPORTANCE TO MAN; OTHER ORGANISMS ASSOCIATED WITH THE BOTTOM OF THE BERING SEA; COMPLETE WITH OR PREY UPON ANIMALS OF USE TO MAN. MANY MEMBERS OF THE MACROBENTHOS, HOWEVER, PROVIDE A NUTRITIONAL BASE FOR FISH AND CRUSTACEANS OF COMMERCIAL IMPORTANCE. DENSITY OF THE BENTHOS IS HIGHEST IN THE WESTERN AND NORTHERN PARTS OF THE SHELF REGION, REACHING A MAXIMUM AVERAGE FIGURE OF 905G/M² IN THE CHIRIKOV BASIN THE LOWEST VALUE IS 55G/M² FOR THE BROAD SHELF PLACE. IN TOTAL BENTHOS BIOMASS BY REGION, THE CHIRIKOV BASIN ALONE HAS AN ESTIMATED 40.5 MILLION METRIC TONS, OR ALMOST TWICE THAT OF THE WESTERN BERING SEA. THE NORTHERN BERING SEA, IN FACT, ACCOUNTS FOR 80 PERCENT OF THE TOTAL BENTHOS BIOMASS OF THE SHELF REGION. IN THE SOUTHEASTERN SECTOR, WHERE OVER ONE MILLION METRIC TONS OF BOTTOM FISH HAVE BEEN REMOVED ANNUALLY IN RECENT YEARS, THE AMOUNT OF BENTHOS IS LESS THAN 10 PERCENT OF THE ESTIMATED TOTAL FOR THE BERING SEA. THE DISTRIBUTION OF THE FOOD BENTHOS PARALLELS SOMEWHAT THAT OF THE TOTAL BIOMASS, BUT THE PROPORTION OF FOOD BENTHOS TO TOTAL BENTHOS IS HIGHEST (OVER 50 PERCENT) IN THE GULF OF ANADYR AND THE SOUTHEASTERN SHELF REGION. THE WESTERN BERING SEA LACKS A DEVELOPED FOOD BENTHOS BUT IS EXCEEDINGLY RICH IN EPIBENTHIC ANIMALS SUCH AS SAND DOLLARS, BARNACLES, SEA ANEMONES, AND SPONGES.

THE TOTAL ESTIMATE OF FOOD BENTHOS IN THE BERING SEA (64 MILLION METRIC TONS), ONLY 17 PERCENT (OR 11 MILLION METRIC TONS) ARE ACCESSIBLE TO COMMERCIAL CONCENTRATIONS OF DEMERSAL FISH BECAUSE OF THE COLD TEMPERATURES THAT PREVAIL IN MANY PARTS OF THE SEA. IT APPEARS THAT THESE TEMPERATURE BARRIERS LIMIT THE BOTTOM FEEDING FISH FROM INVADING THE RICHLY CONCENTRATED BENTHOS OF THE NORTHERN REGIONS. ALTHOUGH THE BENTHOS PLAYS SOME PART IN SUPPORTING OF THE NUTRITIONAL FRAMEWORK OF THE TOTAL FISHES ON THE NEKTON AND PLANKTON AS WELL

ARNTZ, W.E. NO. 66
 PREDATION BY DEMERSAL FISH AND ITS IMPACT ON THE DYNAMICS OF
 MACROBENTHOS
 TENORE & COULL (EDS) MAR BEN DYN, UNIV. S.C. PRESS: 121-149

SINCE 1968, INVESTIGATIONS HAVE BEEN CARRIED OUT IN THE WESTERN
 BALTIC ON INTER-RELATIONSHIPS OF THE DYNAMICS OF MACROBENTHOS AND
 DEMERSAL FISH. THESE STUDIES HAVE INVOLVED: 1) INVESTIGATIONS OF
 OVER 5,000 STOMACHS & GUT ANALYSES TO QUANTIFY THE FOOD (INCLUDING
 SEASONAL CHANGES) OF COD, WHITING, DAB, PLAICE, FLOUNDER & SOME
 LESS IMPORTANT FISH SPECIES; 2) SURVEY OF INFAUNAL MACROBENTHOS
 OVER EIGHT YEARS (1968-1971 & 1975-1978); & 3) A THREE-YEAR EXPERI-
 MENTAL STUDY ON DYNAMICS & PRODUCTION OF MACROBENTHOS AT THE PUB-
 LISHED ANNUALLY BY THE INTERNATIONAL COUNCIL FOR THE EXPLORATION
 OF THE SEA & FROM OTHER STUDIES CARRIED OUT IN KIEL BAY. THE INTER-
 ACTION OF MACROBENTHOS & DEMERSAL FISH IS DISCUSSED, PARTICULARLY
 REGARDING THE EFFECTS OF SELECTIVE PREDATION. DIFFERENCES IN
 PREDATION INTENSITY FROM YEAR TO YEAR, RESULTING IN REDUCED POPU-
 LATION LEVELS OF MACROBENTHOS, WERE OBSERVED, BUT THE LONG-TERM
 DYNAMICS OF THE MORE IMPORTANT BENTHIC FOOD SPECIES IN THE WEST
 BALTIC WERE SEEMINGLY NOT INFLUENCED BY THE YEAR CLASS STRENGTH
 OF BENTHOS IN DIFFERENT YEARS. LIKEWISE, THE YEAR CLASS AND
 OF PRODUCTION OF THE DEMERSAL FISH STOCKS ON THE AREA. A NUMBER
 OF POSSIBLE REASONS FOR THIS APPARENT LACK OF CORRELATION ARE
 DISCUSSED.

BAKER-DITTUS, A. M. NO. 17
1978. FORAGING PATTERNS OF THREE SYMPATRIC KILLIFISH
COPEIA 1978(3): 383-389.

THREE SYMPATRIC KILLIFISH, FUNDULUS MAJALIS, F. HETEROCLITUS & F.
DIAPHANUS (CYPRINODONTIDAE), USE A WIDE VARIETY OF FOOD ITEMS &
THEIR DIETS OVERLAP. DIET OVERLAP INCREASES WITH INCREASING
FOOD ABUNDANCE. DURING PERIODS OF HIGH FOOD ABUNDANCE THE 3
SPECIES CO-OCCUR IN HIGH DENSITIES WHEREAS DURING PERIODS OF LOW
FOOD ABUNDANCE 1 SPECIES PREDOMINATES.

BASS, R. J. AND J. W. AVAULT JR.
 1975. NO. 15
 FOOD HABITS. LENGTH-WEIGHT RELATIONSHIP, CONDITION FACTOR, AND
 GROWTH OF JUVENILE RED DRUM, SCIAENOPS OCELLATA, IN LOUISIANA
 TRANS AM FISH SOC 104(1): 35-45.

FOOD HABITS OF 568 JUVENILE RED DRUM, SCIAENOPS OCELLATA
 (LINNAEUS), RANGING FROM 8.0 TO 183.0 MM STANDARD LENGTH, WERE
 DETERMINED DURING THE TIME THE FISH UTILIZED A LOUISIANA SALT
 MARSH AS A NURSERY AREA. POTENTIALLY AVAILABLE FOOD ORGANISMS WERE
 SAMPLED DURING THE 7-MO STUDY. SOME DEGREE OF SELECTIVITY BY
 JUVENILE RED DRUM WAS DEMONSTRATED, BUT GENERALLY THE MOST ABUN-
 DANT ORGANISMS OF AN EDIBLE SIZE WERE UTILIZED MOST HEAVILY.
 CHANGES IN FOOD WITH INCREASING SIZE CAN BE DESCRIBED IN THREE
 PHASES: 1) RED DRUM LESS THAN 15 MM ATE ZOOPLANKTON; 2) BETWEEN 15
 MM & 75 MM THE RED DRUM ATE MOSTLY SMALL BOTTOM INVERTEBRATES &
 THE YOUNG OF OTHER FISH; 3) RED DRUM LARGER THAN 75 MM ATE DECAPOD
 (CRABS & SHRIMP) & FISH. SOME DIFFERENCES BETWEEN DAY & NIGHT
 FEEDING WERE FOUND. FOR RED DRUM 65 TO 85 MM THE DOMINANT FOOD
 EATEN WAS GRASS SHRIMP DURING THE DAY, WHEREAS AT NIGHT IT WAS
 FISH. THE LENGTH-WEIGHT RELATIONSHIP WAS $\log W = -7.2052 + (4.1913)$
 (LOG L). THE AVERAGE COEFFICIENT OF CONDITION WAS 1.969. AVERAGE
 GROWTH PER MONTH RANGED BETWEEN 13.8 & 25.6 MM DURING THE STUDY
 PERIOD.

BELLINGER, J.W. AND J.W. AVAULT JR.
 1971. NO. 25
 FOOD HABITS OF JUVENILE POMPANO, TRACHINOTUS CAROLINUS, IN
 LOUISIANA
 TRANS AM FISH SOC 100(3): 486-494.

FOOD HABITS OF JUVENILE POMPANO (TRACHINOTUS CAROLINUS) IN
 LOUISIANA WERE DETERMINED DURING THE SUMMER OF 1968. STOMACHS OF
 899 JUVENILES WERE EXAMINED FROM STATIONS AT GRAND ISLE & HOLLY
 BEACH, LOUISIANA. THE FISH RANGED FROM 10 TO 125 MM IN TOTAL
 LENGTH. PERCENT FREQUENCY OF OCCURRENCE, PERCENTAGE OF TOTAL
 VOLUME, & SEASONAL VARIATION IN DIET WERE DETERMINED. JUVENILE
 POMPANO IN LOUISIANA ATE POLYCHAETES, SMALL CLAMS, GASTROPOD LARVAE,
 COPEPODS, MYSIDS, ISOPODS, AMPHIPODS, POSTLARVAL SHRIMP, ANOPELS,
 (SAND CRABS), BRACHYURANS (JUVENILES), MEGALOPS, EGGS, INSECTS,
 & SMALL FISHES. SMALL JUVENILES ATE A WIDE VARIETY OF ORGANISMS &
 APPEARED TO BE OPPORTUNISTIC, APPARENTLY FEEDING ON THOSE
 ORGANISMS MOST ABUNDANT AT THE TIME. LARGER JUVENILES ATE A MORE
 LIMITED DIET, CONSISTING PRIMARILY OF COQUINA CLAMS.

BENNETT, J.A. NO. 13
 1973. HABITS AND FEEDING CHRONOLOGY OF THE LONGNOSE KILLIFISH
 FUNDULUS SIMILIS (BAIRD AND GIRARD) FROM ST. LOUIS BAY, MISS.
 M.S. THESIS, DEPT. OF ZOOLOGY, MISS. STATE UNIVERSITY, 32PP.

FUNDULUS SIMILIS, THE LONGNOSE KILLIFISH, WAS AN ABUNDANT PERMANENT RESIDENT ALONG THE SHIFTING SAND BEACHES OF THE ST. LOUIS BAY ESTUARINE AREA. STOMACH CONTENTS WERE ANALYZED FROM FISH COLLECTED FROM JUNE 1971-NOVEMBER 1972 CONSIDERING DIET, MONTHLY, SEASONAL, & SIZE CLASS INFLUENCES. THE YOUNG FED PRIMARILY ON AMPHIPODS & MYSID SHRIMP. AT ABOUT 32 MM S.L., DIETARY PREFERENCES SHIFTED MORE TOWARD AMPHIPODS WHICH REMAINED THE MOST IMPORTANT FOOD SOURCE AFTER ATTAINING THIS SIZE. THE LARGE INCIDENCE OF AMPHIPODS CONTRIBUTED GREATLY TO THE PROMINENCE OF THE CRUSTACEAN AS A GROUP MOST IMPORTANT IN OCCURRENCE & VOLUME. THE PRIMARY BREAKDOWN OF FOOD ITEMS IS: AMPHIPODS 51%; OSTRACODS 6%; MYSIDACEA 5%; PALAEMONIDAE 5%; COPEPODA 1%; SEDIMENT 12%; ANNELIDA (POLYCHAETES) 11%; DIPTERA 5%; HYMENOPTERA 3%; COLEOPTERA 1%. STOMACH CONTENT ANALYSIS INDICATED THAT FEEDING OCCURRED FROM ABOUT DAWN UNTIL DUSK, WITH A BREAK IN FEEDING OCCURRING IN THE EARLY AFTERNOON. THE STOMACHS OF FISH COLLECTED FROM 2-3 HOUR AFTER DARK UNTIL DAWN SHOWED A MARKED INCREASE IN THE NUMBER OF EMPTY STOMACHS & PROGRESSED TO A POINT WHERE THE ENTIRE DIGESTIVE TRACT. AMPHIPODS OCCURRED IN THE HIGHEST PERCENTAGE VOLUMES DURING ALL SEASONS EXCEPT SUMMER WHEN MYSID SHRIMPS PREDOMINATED. POLYCHAETES EXHIBITED THE SECOND HIGHEST PERCENTAGE VOLUMES IN ALL SEASONS EXCEPT WINTER WHEN THE TERRESTRIAL INSECTS (DIPTERANS & HYMENOPTERANS) INCREASED CONSIDERABLY. A SHORT DISCUSSION OF THE FOOD ITEMS OF THE PREY SPECIES INVOLVED INDICATES THAT FUNDULUS SIMILIS SERVES AS AN INTERMEDIATE STEP BETWEEN DETRITUS-ALGAE CONSUMERS & TOP CARNIVORES.

BERG, J.
 1979. NO. 59
 DISC. OF METH. OF INVESTIGATING FOOD OF FISHES, WITH REF. TO A
 PRELIM. STUDY OF PREY OF GOBIUSCULUS FLAVESCENS (GOBIIDAE)
 MAR BIOL 50: 263-273

THE VALIDITY, RELIABILITY & PRACTICABILITY OF DIFFERENT METHODS
 FOR THE INVESTIGATION OF STOMACH CONTENTS OF A SMALL PLANKTON-
 EATING FISH ARE DISCUSSED. TESTS DEMONSTRATED THE PROBLEMS RELATED
 TO MASS & VOLUME MEASUREMENTS OF PLANKTONIC FOOD. SEVERAL
 NUTRITION INDICES, PARTICULARLY HYNES'S "FREQUENCY OF OCCURRENCE"
 ARE CRITICIZED. A LOGARITHMIC VERSION OF SHORIGIN'S INDEX IS
 PROPOSED AS A REPLACEMENT FOR IVLEV'S FOOD SELECTION INDEX. A
 PRELIMINARY STUDY ON THE FOOD OF GOBIUSCULUS FLAVESCENS (FABRI-
 CIUS), SAMPLED IN JULY, 1975 AT HELGOLAND, PROVIDES SOME NUMERICAL
 INFORMATION ON THE COMPOSITION OF ITS STOMACH CONTENTS & FOOD
 PREFERENCE.

BOOTHBY, R.N. AND J.W. AVAULT JR.
1971. NO. 16
FOOD HABITS, LENGTH-WEIGHT RELATIONSHIP, AND CONDITION FACTOR OF
THE RED DRUM (SCIAENOPS OCELLATA) IN SOUTHEASTERN LOUISIANA
TRANS AM FISH SOC 100(2): 290-295.

A TOTAL OF 349 ADULT RED DRUM (SCIAENOPS OCELLATA) WERE COLLECTED FROM THE COASTAL MARSH BELOW HOPEDALE IN SOUTHEASTERN LOUISIANA, BETWEEN OCTOBER, 1967 & OCTOBER, 1968. A TOTAL OF 286 FISH (82%) CONTAINED IDENTIFIABLE FOOD ITEMS WHICH WERE ANALYZED AS TO FREQUENCY OF OCCURRENCE & PERCENT OF TOTAL VOLUME. THE MAIN FOOD ITEMS IN ORDER OF OCCURRENCE WERE FISH, SHRIMP, & CRABS. BLUE CRABS, MUD CRABS, & PENAEID SHRIMP WERE THE CRUSTACEANS MOST FREQUENTLY EATEN, & AT LEAST 14 DIFFERENT SPECIES OF FISH WERE UTILIZED TO SOME DEGREE. FOOD HABITS VARIED SUBSTANTIALLY FROM SEASON TO SEASON. FISH WAS THE MAIN FOOD ITEM DURING WINTER & SPRING MONTHS. CRUSTACEANS, CRABS & SHRIMP COMBINED COMPRISED THE BULK OF THE DIET DURING THE SUMMER & FALL MONTHS. ONLY SLIGHT DIFFERENCES IN FOOD HABITS WERE DETECTED DUE TO SIZE OR SEX. GONADAL EXAMINATION OF EIGHT ADULTS INDICATED THAT SPawning TOOK PLACE BETWEEN SEPTEMBER & DECEMBER. THE LENGTH-WEIGHT RELATIONSHIP & SEASONAL CONDITION VALUES WERE DETERMINED. RED DRUM OF A GIVEN STANDARD LENGTH WERE GENERALLY HEAVIER THAN PREVIOUSLY REPORTED. CONDITION VALUES FROM THIS STUDY REPRESENTED FISH IN OVERALL GOOD CONDITION.

BORTONE, S. A. NO. 14
 STUDIES ON THE BIOLOGY OF THE SAND PERCH, DIPLECTRUM FORMOSUM
 (PERCIFORMES: SERRANIDAE)
 TECH SERIES, DEPT OF NATURAL RESOURCES, FL, 65:1-27

BIOLOGY OF THE HERMAPHRODITIC SERRANID, DIPLECTRUM FORMOSUM, WAS
 STUDIED DURING 1969 IN THE NORTHERN GULF OF MEXICO. THE SPECIES
 RANGES FROM NORTH CAROLINA TO URUGUAY, THROUGHOUT THE GULF OF
 MEXICO. IN THE NORTHERN GULF THE SPECIES COMMONLY OCCURS AT DEPTHS
 OF 50 M. OR LESS, OVER SAND BOTTOM AT THE BASE OF LOW-LYING REEFS
 OR OTHER BOTTOM FORMATIONS. THE SPECIES DOES NOT TOLERATE COLDER
 WATER & MOVES OFFSHORE AT THE ONSET OF WINTER. SALINITIES AT
 WHICH THE SPECIES IS FOUND APPROACH THAT OF NORMAL OPEN SEA
 WATER. FISH SPECIES ASSOCIATED WITH D. FORMOSUM ARE THOSE TYPICAL
 TO THE BOTTOM HABITAT OF REEF COMMUNITIES. LENGTH-WEIGHT RELATION
 SHIP CAN BE EXPRESSED BY $W = 0.00935 L^{3.04051}$; MAXIMUM AGE
 ATTAINED IN THE SPECIMENS EXAMINED WAS SIX YEARS; MAXIMUM SIZE WAS
 223 MM SL. GROWTH RATE FOR D. FORMOSUM IS MODERATE WITH MAXIMUM
 GROWTH IN THE FIRST YEAR. BETWEEN THE SECOND & THIRD YEARS OF
 LIFE. REPRODUCTION OCCURS IN LATE SPRING & SUMMER. THE
 SPECIES SHOWS GONAD. THERE WAS NO EVIDENCE THAT INDICATED THE
 OCCURRENCE OF SELF-FERTILIZATION. STOMACH ANALYSES INDICATED THAT
 SHRIMP & CRABS MADE UP A LARGE PORTION OF THE DIET. AMPHIPODS WERE
 RELATIVELY IMPORTANT FOR SMALLER FISH. WHILE LARGER FISH CONSUMED
 GREATER AMOUNT OF BOTTOM FISH. SPECIES TENDS TO SET UP HOME
 AREAS IN WHICH IT CARRIES OUT ITS LIFE ACTIVITIES. IT ALSO SHOWS A
 DIURNAL ACTIVITY PATTERN WHICH HAS BEEN SUBSTANTIATED BY LABORA-
 TORY EXPERIMENTS. CHANGES IN COLOR ARE DUE TO PRESERVATION,
 ACTIVITY & GROWTH.

BROOK, I. M. NO. 58
1977. TROPHIC RELATIONSHIPS IN A SEAGRASS COMMUNITY IN CARD SOUND, FLA.
FISH DIETS IN RELATION TO MACROBENTHIC AND CRYPTIC FAUNAL ABUND.
TRANS AM FISH SOC 106(3): 219-229.

SEAGRASS COMMUNITIES ARE A MAJOR FEATURE OF SHALLOW MARINE AREAS THROUGHOUT THE WORLD. THE MARINE SPERMATOPHYTE THALASSIA TESTUDINUM IS THE DOMINANT SEAGRASS IN SOUTHEAST FLORIDA & THE FLORIDA GULF COAST. THE TROPHIC INTERACTION BETWEEN THE FISHES & THE MACROBENTHIC & CRYPTIC FAUNA FOUND IN THE AREA WAS EXAMINED. BASED ON DIGESTIVE TRACT ANALYSIS, THE PRINCIPAL INTERACTION BETWEEN THE PRIMARY CONSUMERS OF THE STUDY AREA & THE HIGHER TROPHIC LEVEL PREDATORS WAS VIA THE POLYCHAETES & PERACARIDEAN CRUSTACEANS. THE MOLLUSKS WHICH CONTRIBUTED SIGNIFICANTLY TO THE BENTHIC BIOMASS WERE NOT A PREFERRED FOOD FOR THE ANIMALS FREQUENTING THE STUDY SITE. THE MAXIMUM MOLLUSK BIOMASS IN ANY BENTHIC & CRYPTIC SAMPLE WAS 2.31 G DRY/M². IT WAS FELT THAT THE PREDATOR POPULATION WAS LIMITED BY THE SMALL STOCK OF POLYCHAETES & PERACARIDEAN CRUSTACEANS WHICH HAD A MAXIMUM BIOMASS IN ANY ONE SAMPLE EQUIVALENT TO 1.74 G DRY/M². AREA. THE MAJORITY OF THE FISHES CAPTURED TO OVER A WIDE AREA. THE MAIN RESIDENTS WERE THE SYNGNATHIDS & THE GOLD-SPOTTED KILLIFISH, FLORIDICHTHYS CARPIO.

CARR, W.E.S. AND C.A. ADAMS
 NO. 27
 1972 EVIDENCE OF THE CLEANING HABIT IN OLIGOPLITES SAURUS AND DIPLODUS
 HOLBROOKI
 FISH BULL 70(4): 1111-1120.

QUANTITATIVE GRAVIMETRIC ANALYSES OF STOMACH CONTENTS OF JUVENILE
 LEATHERJACKET, OLIGOPLITES SAURUS, & SPOTTAIL PINFISH, DIPLODUS
 HOLBROOKI, HAVE REVEALED THATS FROM BOTH SPECIES PASS THROUGH A STAGE IN
 WHICH THEY CLEAN ECOTOPASITES FROM OTHER FISHES. THIS CLEANING
 STAGE IS MOST EVIDENT IN JUVENILES BETWEEN 26 & 40 MM STANDARD
 LENGTH & IS EVIDENT IN JUVENILES BETWEEN 26 & 40 MM CR. SMALLER
 SIZE TEND TO BE LESS EVIDENT. THE FIRST REPORT THAT CLEANING IS
 PRACTICED BY EITHER SPECIES & HABIT THE FIRST QUANTITATIVE DATA ON THE
 SIGNIFICANCE OF THE CLEANING HABIT TO MEMBERS OF THE FAMILY
 CARANGIDAE. CLEANING AS A SOURCE OF FOOD. JUVENILES OF
 DIPLODUS EXCLUSIVELY ON PLANKTON & SMALL SHRIMP ALGAE; PLANKTON &
 O. SAURUS FEED HEAVILY ON EPIPHYTIC ALGAE; PLANKTON &
 ENCRUSTING IN DIET DURING GROWTH.

CARR, W.E.S. AND C.A. ADAMS
1973. NO. 19
FOOD HABITS OF JUVENILE MARINE FISHES OCCUPYING SEAGRASS BEDS IN
THE ESTUARINE ZONE NEAR CRYSTAL RIVER, FLORIDA
TRANS AM FISH SOC 102(3): 511-540.

QUANTITATIVE GRAVIMETRIC ANALYSES OF STOMACH CONTENTS WERE CARRIED OUT ON JUVENILES OF 21 SPECIES OF FISHES THAT COHABIT SEAGRASS BEDS NEAR CRYSTAL RIVER, FLORIDA. OUR ANALYSES WERE BASED ON DRY WEIGHTS OF FOOD ITEMS & ARE EXPRESSED AS PERCENT OF TOTAL STOMACH CONTENTS. THE SPECIES ANALYZED WERE HARENGULA PENSAEOLAE, SYNODUS OPISTHONEMA OGLINUM, ANCHOA HEPSTUS, ANCHOA MITCHELLI, UNIFASCIAE, FORTENS, STRONGYLURA MARINA, HYPOPHAMPHUS EUCINOSTOMUS, GULA, OLIGOPLITES SAURUS, TRACHINOTUS FALCATUS, BAIRODIELLA CHRYSURA, HAENULON PLUNIERI, DIPLODUS HOLBROOKI, LAGODON RHOMBOIDES, CYNOSCION NEBULOSUS, CHASMODES SABURRAE, NEMIDIA BERYLLINA, MICROGOBUS GULATUS, & SPHOEROIDES NEPHELUS. ANALYSES OF STOMACH CONTENTS TAKEN FROM SMALL, SEQUENTIALLY ARRANGED SIZE CLASSES, HABIT ENABLED US TO DELINEATE IN THE 15 SPECIES IN WHICH PLANKTIVOROUS FEEDING STAGES WERE DETECTED. ONLY ZOOPLANKTERS WERE CONSUMED IN MEASURABLE AMOUNTS. JUVENILES OF H. PENSAEOLAE, O. OGLINUM, A. HEPSETUS, A. MITCHELLI, & M. BERYLLINA WERE ALMOST EXCLUSIVELY PLANKTIVOROUS THROUGHOUT MOST OF THE AVAILABLE SIZE RANGES & EXHIBITED A DISTINCT SELECTION FOR MOLLUSCAN VELIGER LARVAE. COPEPODS, MYSIDS, & LARVAL CRUSTACEANS WERE THE PRINCIPAL PLANKTERS CONSUMED BY JUVENILES OF OTHER SPECIES. ONLY THREE SPECIES, D. HOLBROOKI, L. RHOMBOIDES, & H. UNIFASCIAE, EXHIBITED HERBIVOROUS FEEDING STAGES. IN BOTH D. HOLBROOKI & L. RHOMBOIDES, THE HERBIVOROUS HABIT BEGAN QUITE EARLY IN JUVENILE DEVELOPMENT & FOLLOWED A PRELIMINARY PLANKTIVOROUS STAGE. LARGER SPECIMENS OF L. RHOMBOIDES BECAME CARNIVOROUS, WHEREAS ADULTS OF D. HOLBROOKI (& H. UNIFASCIAE) WERE HERBIVOROUS. JUVENILES OF EIGHT SPECIES EXHIBITED CARNIVOROUS FEEDING STAGES, CONSUMING PRIMARILY BENTHIC INVERTEBRATES. OF THESE SPECIES, G. SAURUS, H. PLUMIERI, G. CHRYSURA, & B. MACULATUS CONSUMED PRIMARILY POLYCHAETES; C. SABURRAE CONSUMED PRIMARILY AMPHIPODS; & T. FALCATUS CONSUMED MAINLY CRABS AFTER UTILIZING MYSIDS, SMALL SHRIMP & FISH IN EARLY STAGES. *

CHAO, L.N. AND J.A. MUSICK
1977. HISTORY, FEEDING HABITS, AND FUNCTIONAL MORPHOLOGY OF
JUVENILE SCIAENID FISHES IN YORK RIVER ESTUARY, VIRGINIA.
FISH BULL 75(4): 657-702.

FOUR ABUNDANT SCIAENID FISHES, Cynoscion regalis, Bairdiella chrysoura, Microgadomus undulatus, & Leiostomus xanthurus, USE THE YORK RIVER, VA., AS A NURSERY GROUND FOR ADULT SEASONAL FEEDING. IN ADDITION, SIX SPECIES OF SCIAENID, Cynoscion nebulosus, Pogonias cromis, & Larimus fasciatus, ARE FIRST CAUGHT IN THE ESTUARY OCCASIONALLY. YEARLING C. REGALIS WERE FIRST CAUGHT IN APRIL & YOUNG OF THE YEAR IN JULY OR AUGUST. YEARLING B. CHRYSOURA WERE FIRST CAUGHT IN MARCH OR APRIL & YOUNG OF THE YEAR IN JULY OR AUGUST. JUVENILE MICROGADOMUS UNDULATUS & LEIOSTOMUS XANTHURUS WERE FIRST CAUGHT IN THE YORK RIVER ALL YEAR-ROUND. YOUNG OF THE YEAR WERE FIRST CAUGHT IN APRIL & M. UNDULATUS WERE FIRST CAUGHT IN MAY. XANTHURUS WERE FIRST CAUGHT IN APRIL & M. UNDULATUS WERE FIRST CAUGHT IN JUNE, WHICH MAY INDICATE A PROLONGED SPAWNING SEASON (OR A LATE SPAWNING DURING LATE FALL OR EARLY WINTER). WATER TEMPERATURE & DISSOLVED OXYGEN SEEMED TO BE THE MOST IMPORTANT FACTORS IN THE SPATIAL & TEMPORAL DISTRIBUTION OF THESE FOUR SPECIES IN THE YORK RIVER. MOUTH POSITION, DENTITION, GILL RAKERS, DIGESTIVE TRACT, PORES & BARBELS, C. REGALIS, B. CHRYSOURA, & L. FASCIATUS, MENTICIRRHUS SAXATILIS, & LEIOSTOMUS XANTHURUS, WERE FOUND TO BE IMPORTANT IN LOCATING & INGESTING PREY IN THE WATER COLUMN. STOMACH CONTENTS INDICATED THAT THE FOOD PARTITIONING OF THESE SIX SPECIES WAS CLOSELY RELATED WITH THE SPECIES & THEIR PREY HABITS. LARIMUS FASCIATUS, C. REGALIS, & B. CHRYSOURA, FED MAINLY ABOVE THE BOTTOM, WHEREAS MICROGADOMUS UNDULATUS, MENTICIRRHUS SAXATILIS, & L. XANTHURUS FED ON EPIFAUNA, INFAUNA, OR BOTH. JUVENILE SCIAENIDS ARE ABLE TO COEXIST IN THE SAME AREA BECAUSE OF DIFFERENCES IN SPATIAL & TEMPORAL DISTRIBUTION, RELATIVE ABUNDANCE, & FOOD HABITS.

DARNELL, R. M. NO. 75
1958. HABITS OF FISHES AND LARGER INVERTEBRATES OF LAKE
PONTCHARTRAIN, LA., AN ESTUARINE COMMUNITY
PUBL INST MAR SCI, UNIV TEXAS 5: 353-416

THE LAKE PONTCHARTRAIN PHYSICAL ENVIRONMENT WAS CHARACTERIZED BY
MODERATE TEMPERATURE, LOW SALINITY AND HIGH TURBIDITY. FOOD HABITS
OF 31 FISH AND 4 INVERTEBRATE SPECIES WERE EXAMINED. MOST SPECIES
WERE FOUND TO BE OMNIVOROUS WITH ONTOGENETIC SHIFTS IN DIET
RECOGNIZABLE. ORGANIC DETRITUS WAS AN IMPORTANT FOOD ITEM FOR MOST
SPECIES. TOP PREDATORS WERE SUPPORTED BY BOTH PLANKTONIC AND
BENTHIC FOOD CHAINS, BUT DISTINCT CONSUMER TROPHIC LEVELS WERE NOT
APPARENT. *

DARNELL, R.M. NO. 76
1961. TROPHIC SPECTRUM OF AN ESTUARINE COMMUNITY, BASED ON STUDIES OF
LAKE PONTCHARTRAIN, LOUISIANA
ECOLOGY 42(3): 553-568.

THE LAKE PONTCHARTRAIN COMMUNITY IS A BROADLY OPEN SYSTEM EXCHANGING NUTRIENTS WITH ADJACENT FRESH WATER AND SALT WATER AREAS AS WELL AS WITH NEIGHBORING MARSHES AND SWAMPS. CONSUMERS WITHIN THE LAKE APPARENTLY DEPEND IN GREAT MEASURE UPON PRIMARY PRODUCTION WHICH TAKES PLACE OUTSIDE THE LAKE, SO THE ESTUARINE COMMUNITY MAY BE TROPHICALLY UNBALANCED. THE MOST CONSPICUOUS SINGLE FOOD ITEM IN THE DIETS OF THE CONSUMERS OF THIS COMMUNITY IS ORGANIC DETRITUS WITH ITS ATTENDANT BACTERIA. INDIVIDUAL SPECIES DO NOT APPEAR TO CONFORM TO SPECIFIC TROPHIC LEVELS ON THE BASIS OF THE FOLLOWING CONSIDERATIONS: A) OMNIVORY ON THE PART OF MOST, IF NOT ALL, OF THE MAJOR CONSUMERS, B) NUTRITIONAL OPPORTUNISM AMONG THE CONSUMERS, C) ONTOGENETIC CHANGE IN THE FOOD HABITS OF THE CONSUMERS, D) IMPORTANCE OF ORGANIC DETRITUS IN THE NUTRITION OF THE CONSUMER SPECIES, AND E) COMPLEX NATURE OF THE ORIGIN OF DETRITUS. *

DESSELLE, W. J. ET AL. 26
1978. NO. 26
A DISCRIMINANT FUNCTION ANALYSIS OF SUNFISH (LEPOMIS) FOOD HABITS
AND FEEDING NICHE SEGREGATION IN LAKE PONTCHARTRAIN, LA. ESTUARY
TRANS AM FISH SOC 107(5): 713-719.

THE FOOD HABITS OF FOUR SPECIES OF SUNFISH, LEPOMIS MACROCHIRUS, L.
MICROLOPHUS, L. PUNCTATUS, & L. GULOSUS WERE STUDIED IN THE LAKE
PONTCHARTRAIN ESTUARY. FORTY ESTUARINE FOOD ITEMS WERE IDENTIFIED
FROM STOMACH SAMPLES. ALTHOUGH THE FOOD ITEMS WERE DIFFERENT FROM
THOSE OF LEPOMIS SPP. IN FRESH WATER, SPECIFIC FEEDING PATTERNS IN
REGARD TO PREY SIZE & SPACE PARTITIONING WERE COMPARABLE. A
DISCRIMINANT FUNCTION ANALYSIS WAS USED TO OBJECTIVELY COMPARE
SPECIFIC DIFFERENCES IN STOMACH CONTENT DATA. DIFFERENCES IN
DISCRIMINANT FUNCTION SCORES APPEARED TO BE DUE TO INTERSPECIFIC
FEEDING NICHE SEGREGATION.

DE SYLVA, D.P. NO. 41
 1975. NEKTONIC FOOD WEBS IN ESTUARIES
 CRONIN, L.E. (ED) ESTUARINE RESEARCH VOL. 1, ACADEMIC PRESS: 420-447

ESTUARINE NEKTON IS PREDOMINATELY FISHES WHICH COMPRISE BOTH SURFACE-SWIMMING SPECIES & SPECIES WHICH ARE BENTHIC BUT MAY FEED IN THE OVERLYING WATER COLUMN. BIOTIC & ABIOTIC FACTORS AFFECT THE DISTRIBUTION OF ESTUARINE NEKTON & ITS FOOD; FEW STUDIES OF NEKTONIC FOOD WEBS HAVE INCLUDED CONCOMITANT ENVIRONMENTAL STUDIES TYPICAL & ATYPICAL NEKTONIC FOOD WEBS ARE COMPARED FROM ENGLAND, THE NEW YORK BIGHT, SOUTH FLORIDA, GUYANA, ARGENTINA, & INCLUDE ANALYSES OF BIOTIC & ABIOTIC FACTORS IN THOROUGH DIET & SEASONAL STUDIES OF NEKTONIC FOOD WEBS, DEVELOPMENT OF APPROPRIATE SAMPLING GEARS, GOOD PRESERVATION OF SAMPLES, & LABORATORY & FIELD STUDIES WHICH INCLUDE ECOLOGICAL & BEHAVIORAL STUDIES OF ESTUARINE NEKTON.

DEVANE, J.C., JR. NO. 54
1978. OF KING MACKEREL, SCOMBEROMORUS CAVALLA, IN ONSLOW BAY, NORTH
CAROLINA
TRANS AM FISH SOC 107(4): 583-586.

THE STOMACHS OF 205 KING MACKEREL, SCOMBEROMORUS CAVALLA (CUVIER),
COLLECTED IN ONSLOW BAY, NORTH CAROLINA WERE EXAMINED FOR FOOD
ITEMS. THE STOMACH CONTENTS OF THE 113 STOMACHS CONTAINING ATLANTIC
WERE COMPOSED MAINLY OF FISH. (35% OCCURRENCE) & ATLANTIC THREAD
MERRHADEN, BREVORTONEMA OGLINUM (28% OCCURRENCE). OTHER FISHES &
INVERTEBRATES RANKED FROM 14% TO LESS THAN 1% IN OCCURRENCE. DOMI
NANT IN THE STOMACHS OF KING MACKEREL WERE DURING THE SPRING
& SUMMER MONTHS. THOSE COLLECTED DURING THE FALL MONTHS HAD
INGESTED A WIDER HERRING BEING OF MINOR IMPORTANCE.
ATLANTIC

DIENER, R.A., A. INGLIS AND G.B. ADAMS
1974. NO. 36
STOMACH CONTENTS OF FISHES FROM CLEAR LAKE AND TRIBUTARY WATERS,
A TEXAS ESTUARINE AREA
CONT MAR SCI 18: 7-17

STOMACH CONTENTS WERE ANALYZED FROM 5,019 BONY FISHES, REPRESENTING 40 SPECIES, CAUGHT DURING 1958 BY TRAWL IN THE CLEAR LAKE AREA, A SECONDARY BAY SYSTEM LOCATED ON THE WEST SIDE OF UPPER GALVESTON BAY, TEXAS. THE MOST FREQUENTLY OBSERVED ITEMS INCLUDED POLYCHAETE ANNELIDS, COPEPODS, MYSIDACEANS, PENAEID SHRIMP, RIVER SHRIMP (MACROBRACHIUM SP.), GRASS SHRIMP (PALAEMONETES SP.), PLANT DEBRIS, ORGANIC DETRITUS, MUD, & SAND.

DUNN, J. R. NO. 74
1979. PREDATOR-PREY INTERACTIONS IN THE EASTERN BERING SEA
STROUD & CLEPPER (EDS) SYMP PRED-PREY SYST FISH MGMT, ATL, GA: 81-92
FOOD HABITS OF POLLACK, YELLOWFIN SOLE, GREENLAND TURBOT AND PACIFIC
COD WERE EXAMINED. DIETARY DIFFERENCES WERE RELATED TO MORPHOLOGY
AND ONTOGENETIC PATTERNS. MOST SPECIES OF DEMERSAL FISHES PRESENT
WERE OPPORTUNISTIC FEEDERS WITH HIGHLY VARIABLE DIETS IN SPACE AND
TIME. FEW SPECIES WERE COMPLETELY DEPENDENT ON BENTHIC PREY. *

FOX, L.S. AND C.J. WHITE
1969. NO. 71
FEEDING HABITS OF THE SOUTHERN FLOUNDER, *PARALICHTHYS LETHOSTIGMA*,
IN BARATARIA BAY, LOUISIANA
LOUISIANA ACAD SCI 32: 31-38.
VOLUMES & FREQUENCY OF OCCURRENCE OF THE STOMACH CONTENTS OF 305
SPECIMENS WERE ANALYZED. NO SIGNIFICANT DIFFERENCES IN FOOD
HABITS WITH RELATION TO SEX OR SIZE WERE DETECTED. THIS SPECIES IS
HIGHLY PREDACIOUS. WITH MAJOR FOOD SOURCES BEING FISH, SHRIMP, &
CRABS. THE FEEDING HABITS VARY WITH SEASONAL AVAILABILITY IN
BARATARIA BAY. SEINE SAMPLES WERE USED TO DETERMINE AVAILABILITY &
SEASONAL ABUNDANCE OF 46 SPECIES PREYED UPON.

FRITZ, E.S. NO. 55
 1974. DIET COMPARISON IN FISHES BY SPEARMAN RANK CORRELATION
 COEFFICIENTS
 COPEIA 1974(1): 210-214.

THE SPEARMAN RANK CORRELATION & T-TEST WERE EMPLOYED AS A NOVEL METHOD FOR COMPARATIVE ANALYSIS OF TOTAL DIETS OF THREE SPECIES OF KILLIFISH (CYPRINODONTIDAE). THE CALIFORNIA KILLIFISH, *FUNDULUS KILLIFISH*, *OF NOVA SCOTIA* HAVE PARVIPINNISTS & MUMMICHOGS, BUT REMOTELY SEPARATED HABITS IN SIMILAR DIETS IN SIMILAR OF F. HETEROCALITUS INHABITING SUB-CONTINENTAL POPULATION HABITATS. TWO PHYLO-GENETICALLY RELATED SYMPATRIC SPECIES, *F. HETEROCALITUS* & THE BANDED KILLIFISH, *F. DIAPHANUS* ARE SHOWN TO HAVE DIFFERENCE OF THESE RESULTS AGREE WITH THE EXPECTED FEEDING LEVEL CLOSELY RELATED SPECIES WITHINHABITING THE SAME TROPHIC LEVEL SYMPATRICALLY & ALLOPATRICALLY.

HAERTEL, L. AND C. OSTERBERG
1967. NO. 57
ECOLOGY OF ZOOPLANKTON, BENTHOS AND FISHES IN THE COLUMBIA RIVER
ESTUARY.
ECOLOGY 48(3): 459-472.

FAUNA OF THE COLUMBIA RIVER ESTUARY WERE SAMPLED REGULARLY FOR 21 MONTHS. ANALYSES OF PLANKTON SAMPLES INDICATED THAT THREE DISTINCT POPULATIONS EXISTED IN THE ESTUARY: A FRESHWATER GROUP, A MARINE GROUP, & AN INDIGENOUS ESTUARINE GROUP. THE LATTER CONSISTED PRINCIPALLY OF A LARGE POPULATION OF EURYTEMORA HIRUNDOIDES. CHANGES IN THE SALINITY OF THE ESTUARY WERE REFLECTED IN THE COMPOSITION OF THE PLANKTON. THE MAJORITY OF THE FISH & BENTHIC INVERTEBRATES FOUND IN THE ESTUARY ARE EURYHALINE. THE LARGEST NUMBERS OF FISH SPECIES, AS WELL AS THE LARGEST NUMBERS OF INDIVIDUALS, OCCUPY THE SLIGHTLY BRACKISH WATERS OF THE CENTRAL PORTION OF THE ESTUARY. THE MAJOR PLANKTON BLOOMS ALSO OCCUR IN THIS AREA. STARRY FLOUNDER (PLATICHTHYS STELLATUS) & SAND SHRIMP (CRANGON FRANCISCORUM) USE THE UPPER ESTUARY AS A NURSERY GROUND. EXTENSIVE ANALYSES OF FISH STOMACH CONTENTS CONFIRM THAT FOOD HABITS OF FISHES GENERALLY REFLECT THE AVAILABILITY OF PREY.

HANSEN, D. J. NO. 1
 1969. GROWTH, MIGRATION, REPRODUCTION, AND ABUNDANCE OF LAGODON
 RHOMBOIDES AND MICROPOGON UNDULATUS NEAR PENSACOLA, FLORIDA.
 FISH BULL 68(1): 135-146

THE ABUNDANCE, GROWTH, AGE COMPOSITION, FOOD, MIGRATION, & REPRODUCTION OF THE TWO SPECIES WERE STUDIED AT TWO LOCATIONS FOR EACH SPECIES FROM AUGUST 1963 TO DECEMBER 1965. THE MATERIALS COMPRISED 22 FISH COLLECTIONS AT EACH STATION, TAKEN IN ABOUT 500 HOURS OF TRAWLING. THE STOMACH CONTENTS OF 3,577 PINFISH & 2,520 ATLANTIC CROAKERS INDICATED THAT PINFISH ARE OMNIVOROUS & CROAKERS CARNIVOROUS. PRINCIPAL FOODS WERE VEGETATION, CRUSTACEANS, & POLYCHAETE FOR PINFISH & ANNELIDS, FISH, & ARTHROPODS FOR CROAKERS. TYPES OF FOOD IN PINFISH STOMACHS WERE SIMILAR AT ALL SIZES & SEASONS, BUT THE RELATIVE AMOUNT OF EACH TYPE DIFFERED BY SEASON & SIZE OF FISH. FOODS IN CROAKER STOMACHS DIFFERED AT THE TWO STATIONS BUT WERE SIMILAR FROM YEAR TO YEAR. THE AVERAGE AT FOOD VOLUME IN THE STOMACHS VARIED WITH TIME OF YEAR, LOCATION, & FISH SIZE. VOLUMES OF FOOD IN STOMACHS OF BOTH SPECIES DECREASED WHEN THE FISH MOVED FROM THE ESTUARY. LENGTH-FREQUENCY DISTRIBUTIONS CAN BE USED TO ESTIMATE AGE IN BOTH SPECIES. PINFISH, & POSSIBLY CROAKERS, FROM ANNULI ON THEIR SCALES. GROWTH OF PINFISH & ATLANTIC CROAKER VARIED FROM YEAR TO YEAR. SOME FIRST YEAR OF LIFE & MAY SPAWN. BOTH GONADS IN THE FALL OF THEIR FIRST YEAR OF LIFE & MAY SPAWN. BOTH SPECIES MIGRATE OFFSHORE IN THE FALL TO SPAWN. THE FRY & SOME ADULTS RETURN TO THE ESTUARY IN THE WINTER & SPRING. ABUNDANCE OF PINFISH & ATLANTIC CROAKERS WAS HIGHEST IN LATE SPRING & EARLY SUMMER. PINFISH AT BOTH STATIONS & CROAKERS AT ONE STATION WERE LESS ABUNDANT IN 1964 THAN IN 1963 OR 1965. YEARLY DIFFERENCES IN ABUNDANCE OF CROAKERS WERE NOT LARGE AT THE OTHER LOCATION.

HASTINGS, R.W. NO. 56
1973. BIOLOGY OF THE PYGMY SEA BASS, *SERRANICULUS PUMILIO* (PISCES:
SERRANIDAE)
FISH BULL 71(1): 235-241.

DURING THE PERIOD FROM 1968 TO 1971, NUMEROUS SPECIMENS OF THE *SERRANICULUS PUMILIO*, WERE COLLECTED IN SHALLOW WATERS OF THE NORTHERN GULF OF MEXICO. THIS PAPER PRESENTS BIOLOGICAL DATA ACCUMULATED FROM THESE & OTHER SPECIMENS IN THE FISH COLLECTION OF FLORIDA STATE UNIVERSITY & FROM SCATTERED LITERATURE REFERENCES REGARDING THE SPECIES. THE RANGE OF *S. PUMILIO* EXTENDS FROM NORTH CAROLINA ALONG THE CONTINENTAL MARGIN OF THE WESTERN ATLANTIC OCEAN TO GUYANA, BUT IT APPARENTLY DOES NOT OCCUR IN THE WEST INDIES. IT HAS BEEN COLLECTED AT DEPTHS FROM 1 TO 117 M, USUALLY OVER SAND OR SHELL BOTTOMS NEAR CORAL OR ROCK REEFS OR ACCUMULATIONS OF MOLLUSK SHELLS. INDIVIDUALS MOVE ABOUT CONSIDERABLY, ALTHOUGH THEY SPEND MUCH TIME RESTING ON THE BOTTOM. *S. PUMILIO* IS A SYNCHRONOUS HERMAPHRODITE, BUT PAIRS MATE TO EXCHANGE GAMETES & SELF-FERTILIZATION PROBABLY NEVER OCCURS. SPAWNING OCCURS BETWEEN MARCH & AUGUST OR SEPTEMBER IN THE NORTHERN GULF OF MEXICO. A LENGTH-FREQUENCY DISTRIBUTION OF SPECIMENS COLLECTED IN THE YEAR NORTHERN GULF IS PRESENTED TO SHOW THE GROWTH RATE OF FIRST YEAR FISH. JUVENILES (15-20 MM SL) WHICH APPEAR IN SEPTEMBER REACH A SIZE OF 50-55 MM BY THE FOLLOWING JUNE. MOST FISH MOVE OFFSHORE TO DEEPER WATER FOR THE WINTER (JANUARY & FEBRUARY) & INDIVIDUALS LARGER THAN 55 MM APPARENTLY NEVER APPEAR INSHORE. SMALL CRUSTACEANS ARE THE MOST IMPORTANT FOOD ITEMS.

HEARD, R. W. NO. 53
 1975. FEEDING HABITS OF WHITE CATFISH FROM A GEORGIA ESTUARY
 FLORIDA SCIENTIST 38(1): 20-28.

THE FOOD HABITS OF THE WHITE CATFISH, *ICTALURUS CATUS* (L.), FROM
 NORTH NEWPORT RIVER, AN ESTUARINE AREA OF THE GEORGIA COAST, WERE
 STUDIED. THE DIGESTIVE TRACTS OF 174 SPECIMENS EXAMINED CONTAINED
 OVER 5000 RECOGNIZABLE FOOD-ITEMS REPRESENTING SOME 50 DIFFERENT
 SPECIES OF ORGANISMS. CRUSTACEANS, ESPECIALLY AMPHIPODS, COMPRISED
 THE MOST FREQUENTLY OCCURRING & MOST NUMEROUS ORGANISMS EN-
 COUNTERED. THE VARIETY OF ORGANISMS RECOVERED FROM THE DIGESTIVE
 TRACTS OF WHITE CATFISH IN THIS STUDY & FROM THE STOMACHS OF WHITE
 CATFISH PREVIOUSLY STUDIED BY OTHERS, INDICATE THAT THIS FISH IS
 AN OPPORTUNISTIC, OMNIVOROUS FEEDER. SEASONAL MOVEMENTS & DIURNAL
 FEEDING PATTERNS FOR *I. CATUS* ARE BRIEFLY DISCUSSED.

HENWOOD, T., P. JOHNSON AND R. HEARD
1978. NO. 68
FEEDING HABITS AND FOOD OF THE LONGSPINED PORGY, STENOTOMUS
CAPRINUS BEAN
NE GULF SCI 2(2): 133-137.

THE LONGSPINED PORGY, STENOTOMUS CAPRINUS BEAN, IS AN ABUNDANT SPECIES IN THE 40 TO 100 METER DEPTH RANGE OVER MUCH OF THE NORTHERN & WESTERN GULF OF MEXICO. GUNTER & KNAPP (1951), SIEBENALER (1952), HILDEBRAND (1954), CALDWELL (1955), ROITHMAYR (1965), MOORE ET AL. (1970), PERRY (1970), FRANKS ET AL. (1972) & CHITTENDEN & MCEACHRAN (1976) HAVE DOCUMENTED THE OCCURRENCE OF THIS SPECIES IN THE 20 TO 120 METER RANGE. DESPITE AMPLE EVIDENCE THAT THE PORGY IS A MAJOR MEMBER OF THE OFFSHORE DEMERSAL FISH POPULATION, THERE HAVE BEEN NO PUBLISHED REPORTS ON THE FEEDING BEHAVIOR OR FOOD OF THIS FISH. THIS STUDY WAS UNDERTAKEN IN THE HOPES OF CHARACTERIZING MAJOR FOOD ITEMS & FEEDING PATTERNS WITHIN THE SPECIES.*

HOESE, H.D. AND D. HOESE
 1967. STUDIES ON THE BIOLOGY OF THE FEEDING REACTION IN GOBIOSOMA BOSCI
 TULANE STUDIES IN ZOOLOGY 14(2): 55-62.

IN THE NAKED GOBY, GOBIOSOMA BOSCI, AN INHABITANT OF OYSTER REEFS, A FEEDING REACTION WAS INDUCED WITH SIMILAR MOLECULAR STRUCTURE. CERTAIN AMINO ACIDS & AMINES WITH SIMILAR MOLECULAR STRINGS, NITROGEN ALSO INDUCED FEEDING. BASICALLY THEY HAVE THE AREA OF THE BITTER BY CARBON ATOMS, & NO GROUP INTERFERING WITH EXTRACTS WERE BITTER BY ATOM. DIALYZED & CHROMATOGRAPHED WITH KNOWN OF ALANINE, ASPARTIC ACID, GLUTAMIC ACID, GLYCINE, & AN UNKNOWN. THE UNKNOWN, WHICH WAS HEAT STABLE, RECEIVED MOST OF THE RESPONSE WITH ALANINE & TO GOBIES FROM AN OYSTER REEF, BUT NOT TO SEAS WATER. FEEDING SEEMS TO BE GOBIOSOMA BOSCI IS DIVIDED INTO TWO PHASES. FIRST THE OYSTER. FOLLOWING A VOLATILE COMPOUND, POSSIBLY AN AMINE, TO WITH LESSER FEEDING ITSELF IS INDUCED BY A HEAT-STABLE UNKNOWN, WITH LESSER CONTRIBUTION BY CERTAIN AMINO ACIDS.

HOLLAND, A.F. ET AL.
1980. INFLUENCE OF PREDATION ON INFAUNAL ABUNDANCE IN UPPER CHESAPEAKE
BAY, USA
MAR, BIOL 57: 221-235

THE IMPORTANCE OF PREDATORS IN CONTROLLING THE DENSITIES OF
INFAUNAL (>0.5 MM) ORGANISMS WAS INVESTIGATED IN THE MESOHALINE
REGION OF THE UPPER CHESAPEAKE BAY (USA) USING FIELD EXPERIMENTS.
THE ROLE OF PREDATORS IN CONTROLLING INFAUNAL DENSITY & COMMUNITY
CHARACTERISTICS VARIED WITH HABITAT TYPE, SEASON (I.E., PREDATOR
ABUNDANCE) & DEVELOPMENTAL OR SUCCESSIONAL STAGE OF THE COMMUNITY.
FEW INFAUNAL SPECIES WERE ADVERSELY AFFECTED BY PREDATOR EXCLUSION
SPECIES THAT INCREASED GREATLY IN ABUNDANCE IN THE ABSENCE OF
PREDATORS (E.G. ETEONE, HETEROPODA, STREBLOSPIO BENDICTI, NEREIS
SUCCINEA, & JUVENILE MACOMA BALTHICA & MYA ARENARIA) LIVED NEAR
THE SEDIMENT-WATER INTERFACE & HAD MAJOR POPULATION PULSES FROM
FALL THROUGH SPRING. SPECIES WHOSE ABUNDANCES INCREASED MODERATELY
OR WERE NOT AFFECTED BY PREDATOR EXCLUSION WERE DEEPER BURROWING
ORGANISMS (E.G. HETEROMASTUS FILIFORMIS & ADULT MYA ARENARIA),
OR WERE RELATIVELY SMALL ORGANISMS (E.G. PARAPRIONOSPIO PINNATA,
SCOLECOLEPIDES VIRIDIS & PELOSCOLEX GABRIELLA) WHOSE PRINCIPAL
PREDATORS COULD BE OTHER MEMBERS OF THE INFAUNA. COMPETITION DID
NOT APPEAR TO BE AN IMPORTANT FACTOR CONTROLLING INFAUNAL DENSITY
IN THESE EXPERIMENTS.

HYSLOP, E. J. NO. 7
 1980. STOMACH CONTENTS ANALYSIS-A REVIEW OF METHODS AND THEIR
 APPLICATION
 J FISH BIOL 17: 411-429.

METHODS FOR ANALYSING FISH STOMACH CONTENTS ARE LISTED & CRITI-
 CALLY ASSESSED WITH A VIEW TO THEIR SUITABILITY FOR DETERMINING
 DIETARY IMPORTANCE-THIS TERM IS DEFINED. DIFFICULTIES IN THE APPLI-
 CATION OF THESE METHODS ARE DISCUSSED & WHERE APPROPRIATE, ALTER-
 NATIVE APPROACHES PROPOSED. MODIFICATIONS, WHICH HAVE PRACTICAL
 VALUE ARE ALSO CONSIDERED. THE NECESSITY OF LINKING MEASUREMENTS
 OF DIETARY IMPORTANCE TO STOMACH CAPACITY IS EMPHASIZED & THE
 EFFECTS OF DIFFERENTIAL DIGESTION UPON INTERPRETATION OF STOMACH
 CONTENTS OUTLINED. THE BEST MEASURE OF DIETARY IMPORTANCE IS PRO-
 POSED AS ONE WHERE BOTH THE AMOUNT & BULK OF A FOOD CATEGORY ARE
 RECORDED.

JUNE, F.C. AND F.T. CARLSON
NO. 51
1971. OF YOUNG ATLANTIC MENHADEN, BREVOORTIA TYRANNUS, IN RELATION
TO METAMORPHOSIS
FISH BULL 68(3): 493-512.

TO REAR THIS SPECIES IN CAPTIVITY REQUIRED KNOWLEDGE OF THE KINDS
OF ORGANISMS IT ATE. LARVAE ATE ZOOPLANKTON (COPEPODS), BUT
PREJUVENILES & JUVENILES FED CHIEFLY ON PHYTOPLANKTON. TARY TRACT
SIMILARITIES AS WELL AS DIFFERENCES BETWEEN THE ALIMENT COMMUNITY.
CONTENTS OF THE FISH & THE COMPOSITION OF IS WERE ACCOMPANIED BY
CHANGES IN FOOD HABITS DURING IN THE ALIMENTARY TRACT & RELATED
GROSS MORPHOLOGICAL CHANGES OF LARVAE DISCLOSED THAT THEIR
STRUCTURE TO FEED AT LOW LIGHT INTENSITIES. THEIR DIGESTION RATE, &
FAILURE TO DEFECATE TO CAPTURE & PRESERVATION PROBABLY IN
CONTRIBUTED TO THE HIGH INCIDENCE OF EMPTY ALIMENTARY TRACTS IN
FIELD COLLECTIONS.

KINCH, J.C. NO. 50
1979. HABITS OF THE JUVENILE FISHES WITHIN ARTIFICIAL WATERWAYS,
MARCO ISLAND, FLORIDA
CONT MAR SCI 22: 77-90

THE PRESENT INVESTIGATION WAS DIRECTED TOWARD DESCRIBING THE
TROPIC HABITS & FACTORS WHICH AFFECT THE DISTRIBUTION OF JUVENILE
FISHES IN A DREDGED RESIDENTIAL CANAL OF A SOUTHWEST FLORIDA
OCEAN-FRONT DEVELOPMENT. THE DATA PRESENTED PROVIDE A QUANTITATIVE
EXAMINATION OF BOTH THE SPATIAL & TEMPORAL ASPECTS OF THE
MORE ABUNDANT SPECIES. A STRONG SIMILARITY WAS FOUND BETWEEN THE
TROPIC HABITS OF FISHES WITHIN THE CANALS & PUBLISHED DATA FOR
FISHES OF IDENTICAL AGE CLASSES FROM NATURAL AREAS.

KJELSON, M.A. ET AL
 1975. NO. 49
 THE GENERAL FEEDING ECOLOGY OF POSTLARVAL FISHES IN THE NEWPORT
 RIVER ESTUARY
 FISH BULL 73(1): 137-144.

FOOD PREFERENCES, FEEDING INTENSITY & CHRONOLOGY, EVACUATION RATES, & DAILY RATINGS WERE DETERMINED FOR POSTLARVAL STAGES OF ATLANTIC MENHADEN, BREVOORTIA TYRANNUS (25-32 MM); PINFISH, LAGODON RHOMBIDES (16-20 MM); & SPOT, LEIOSOMUS XANTHURUS (17-24 MM). FOUR COPEPOD TAXA, CENTROPAGES, TEMORA, ACARTIA, & HARPACTICOIDA, MADE UP 76-99% OF THE TOTAL GUT CONTENTS. POSTLARVAL FEEDING INTENSITY WAS GREATEST DURING EARLY DAYLIGHT HOURS. POSTLARVAL MENHADEN LOST AN ESTIMATED 60% OF THEIR ORIGINAL GUT CONTENTS DUE TO THE STRESS OF HANDLING & CAPTURE. SIMILAR STRESS CAUSED NO FOOD LOSS IN EITHER POSTLARVAL PINFISH OR SPOT. GASTROINTESTINAL EVACUATION OF COPEPODS & ARTEMIA NAUPLII WERE DESCRIBED BY LINEAR REGRESSION. EVACUATION RATES VARIED DIRECTLY WITH THE AMOUNT OF FOOD IN THE GUT. RATE CONSTANTS WERE USED IN CONJUNCTION WITH INFORMATION ON THE CHRONOLOGY OF GUT CONTENTS TO DETERMINE DAILY RATINGS. DAILY RATION ESTIMATES AS A PERCENT OF THE FISH'S WET BODY WEIGHT WERE: MENHADEN, 4.9%; PINFISH, 3.5%; SPOT, 4.3% & 9.0%. THE RATION ESTIMATES FOR SPOT IN TERMS OF CALORIES PER FISH PER DAY WERE SIMILAR TO THE METABOLIC NEEDS ESTIMATED FROM OXYGEN CONSUMPTION MEASUREMENTS BUT WERE LOWER THAN THE ESTIMATES FROM OXYGEN CONSUMPTION FOR MENHADEN & PINFISH.

KOBYLINSKI, G. J. AND P. F. SHERIDAN
 1979. ABUNDANCE, FEEDING AND LONG-TERM FLUCT. OF LEIOSTOMUS
 XANTHURUS AND MICROPOGONIAS UNDULATUS IN APALACHICOLA BAY, FL. 72-77
 CONT MAR SCI 22: 149-161

SEASONAL DISTRIBUTION, ABUNDANCE & TROPHIC FUNCTIONS OF LEIOSTOMUS
 XANTHURUS & MICROPOGONIAS UNDULATUS WERE STUDIED AT A SERIES OF
 STATIONS IN APALACHICOLA BAY, FLORIDA. HIGHEST CATCH/EFFORT OF SPOT
 WAS FOUND IN UPPER EAST BAY & EAST BAY. APALACHICOLA BAY & EAST
 BAY YIELDED THE GREATEST CATCH/EFFORT OF CROAKER. ABUNDANCE OF THE
 TWO SPECIES PEAKED IN THE SPRING & DECLINED IN THE FALL. STOMACH
 CONTENTS SHOWED CROAKER & SPOT ARE PRIMARILY OMNIVOROUS. PRINCIPAL
 FOODS OF SPOT INCLUDED POLYCHAETES, HARPACTICOID COPEPODS,
 DETRITUS & BIVALVES. CROAKER CONSUMED PRIMARILY POLYCHAETES &
 DETRITUS. COMPARISON OF DIETS OF CROAKER & SPOT REVEALED HIGH
 INTRASPECIFIC SIMILARITY ON A SIZE CLASS BASIS & HIGH INTER
 SPECIFIC SIMILARITY ON AN AREAL BASIS. POPULATION FLUCTUATIONS &
 SPATIAL DISTRIBUTION OF CROAKER & SPOT WERE STUDIED AS A RESPONSE
 TO A NUMBER OF ENVIRONMENTAL & TROPHIC FACTORS. PRESENCE OR
 ABSENCE OF BENTHIC MACROPHYTES, SALINITY, COLOR & TURBIDITY, TIDAL
 BOTTOM TYPE & FOOD AVAILABILITY DETERMINED THE LONG-TERM SPATIAL
 DISTRIBUTION OF THE TWO FISHES. TEMPERATURE IS A CRITICAL PARA
 METER FOR AT LEAST ONE OF THESE SPECIES WHILE VARIATIONS IN RAIN
 FALL & RIVER FLOW HAVE LITTLE EFFECT ON EITHER POPULATION.

LANGTON, R.W. AND R.E. BOWMAN
 NO. 37
 1980. OF FIFTEEN NORTHWEST ATLANTIC GADIFORM FISHES
 FOOD OF FIFTEEN NORTHWEST ATLANTIC GADIFORM FISHES
 NOAA TECHNICAL REPORT NMFS SSRF-740, 23PP

THE FOOD OF 15 SPECIES OF GADIFORM FISHES OCCURRING IN THE NORTH
 WEST ATLANTIC, FROM CAPE HATTERAS, N.C. TO NOVA SCOTIA, HAVE BEEN
 INVESTIGATED FOR THE YEARS 1969-72. THE POPULATIONS OF ATLANTIC
 COD, GADUS MORHUA; POLLOCK, POLLACHIUS VIRENS; SILVER HAKE,
 MERLUCCIIUS BILINEARIS; WHITE HAKE, UROPHYCIS TENUIS; OFFSHORE
 HAKE, MERLUCCIIUS ALBIDUS; & CUSK, BROSME BROSME; HAVE REASONABLY
 SIMILAR DIETS, BEING PRIMARILY PISCIVOROUS. THE HAKE, HAVE SIMI
 LAR DIETS, BEING SPOTTED HAKE, UROPHYCIS REGIUS, ALSO INVERTE
 BRATES. THE FINAL SEVEN SPECIES, PREYING ON BOTH FISH AND AEGLEFINUS
 LONGFIN HAKE, PHYCIS CHESTERII; FOURBEARD, ROCKLING, ENCHILIER,
 COLUMBIANUS; MARLIN-SPIKE, NEZUMIA BAIARDI; LONGNOSE GRUN CERVINUM; &
 COELORHYNCHUS CARMINATUS; FAWN CUSK-EEL, LEPOPHIDIUM CERVINUM; &
 OCEAN POUT, MACROZOAES AMERICANUS; PREY ALMOST EXCLUSIVELY ON
 INVERTEBRATES.

LEVINGS, C.D. NO. 47
 SEASONAL CHANGES IN FEEDING AND PARTICLE SELECTION BY WINTER
 FLOUNDER (PSEUDOPLEURONectes AMERICANUS)
 TRANS AM FISH SOC 103(4): 828-832.
 THE MEAN WEIGHT OF FOOD ITEMS FROM WINTER FLOUNDER (PSEUDOPLEURO
 NECTES AMERICANUS) AT ST. MARGARET'S BAY, NOVA SCOTIA CLOSELY
 COINCIDED WITH THE MEAN WEIGHT OF BENTHIC PREY POTENTIALLY AVAI
 LABLE. FLOUNDER LARGER THAN THE MEAN LENGTH (29 CM) ATE HEAVIER
 PARTICLES. SMALL PARTICLES WERE CONSISTENTLY DISREGARDED. THERE
 WERE SEASONAL CHANGES IN THE WEIGHTS OF FOOD ITEMS USED & IN THE
 PROPORTION OF ORGANISMS TO DETRITUS IN STOMACHS.

MANOCH, C.S.

NO. 20

1971. HABITS OF YEARLING AND ADULT STRIPED BASS, MORONE SAXATILIS,
FROM ALBEMARLE SOUND, NORTH CAROLINA
CHESAPEAKE SCI 14(2): 73-86

A TOTAL OF 1,094 YEARLING & ADULT STRIPED BASS, MORONE SAXATILIS, WERE COLLECTED FROM ALBEMARLE SOUND, NORTH CAROLINA, FROM JULY 1970 THROUGH AUGUST 1971. SPECIMENS WERE CAPTURED BY GILL NETS, HOOK & LINE, TRAWL, POUND NETS, & PURSE SEINE, & RANGED IN SIZE FROM 125 TO 714 MM, TOTAL LENGTH. APPROXIMATELY 77 PERCENT OF THE FISH CONTAINED FOOD CONSISTING OF 3,249 INDIVIDUAL ORGANISMS. TWENTY-FIVE SPECIFIC GROUPS OF FOOD ORGANISMS WERE IDENTIFIED. THESE INCLUDED FIFTEEN SPECIES OF FISH & TEN TAXA OF INVERTEBRATE. FISH WERE THE MAIN FOODS OF STRIPED BASS & OCCURRED IN 93 PERCENT OF THE STOMACHS CONTAINING FOOD. PREDOMINANT SPECIES IDENTIFIED WERE ATLANTIC MENHADEN, BREVOORTIA TYPANNUS, BLUEBACK HERRING, ALOSA AESTIVALS, & BAY ANCHOVY, ANCHOA MITCHILLI. INVERTEBRATES WERE OF SECONDARY IMPORTANCE & CONSISTED MAINLY OF BLUE CRABS, CALLINectes SAPIDUS, PENAEID SHRIMP, & GAMMARID AMPHIPODS. FOOD HABITS VARIED SUBSTANTIAL WITH SIZE OF FISH, AREA & SEASON OF COLLECTION. CANNIBALISM WAS RARELY ENCOUNTERED. ONLY TWO YEARLING STRIPED BASS FROM OVER TWO HUNDRED EXAMINED (1 PERCENT) CONTAINED YOUNG MORONE SAXATILIS. NO STRIPED BASS WERE FOUND IN LARGER SPECIMENS. STRIPED BASS ARE CAPABLE OF CONSUMING CLUPEIDS WHICH ARE APPROXIMATELY 60 PERCENT OF STRIPED BASS LENGTH. STRIPED BASS GENERALLY FED ON SMALLER FISH WHICH AVERAGED 20 PERCENT OF THE PREDATOR'S LENGTH. SIZE AVAILABILITY OF FORAGE IS AN IMPORTANT FACTOR IN ALBEMARLE SOUND. STRIPED BASS PREFERRED THE SOFT-RAYED SPECIES WHICH GENERALLY OCCURRED AS JUVENILES IN THE SOUND.

MANDOCH, C.S. NO. 21
 1977. OF THE RED PORGY, PAGRUS PAGRUS LINNAEUS (SPARIDAE) FROM
 NORTH CAROLINA AND SOUTH CAROLINA
 BULL MAR SCI 24(4): 776-787

DIGESTIVE TRACTS OF 779 RED PORGY, PAGRUS PAGRUS, 46 TO 625 MM
 TOTAL LENGTH. COLLECTED BY HOOK & LINE & TRAWL OFF NORTH CAROLINA
 & SOUTH CAROLINA FROM MAY 1972 THROUGH APRIL 1974 WERE EXAMINED.
 NINETY-SEVEN PERCENT OF THE SPECIMENS CONTAINED FOOD REPRESENTING
 69 TAXA OF ORGANISMS. SEVENTY-FOUR PERCENT OF THE FOODS (& 60%
 OF THE VOLUME) OF ADULT PAGRUS WAS COMPOSED OF OBLIGATE BENTHIC
 ANIMALS & APPROXIMATELY 90% OF THE DIET WAS OF ORGANISMS WHICH
 LIVE NEAR THE BOTTOM. INVERTEBRATES REPRESENTED PRIMARILY BY ADULT
 CRUSTACEANS, MOLLUSKS, & ECHINODERMS. OCCURRED IN 89% OF THE PRE
 FISH. CRABS, MAINLY MAJIDS, PORTUNIDS, & CALAPPIDS WERE THE PRE
 DOMINANT FOOD BY BOTH FREQUENCY OF OCCURRENCE & VOLUME. FISH
 REPRESENTING 14 FAMILIES OCCURRED IN 24% OF THE STOMACHS &
 COMPRISED 15% OF THE FOOD VOLUME OF ADULT RED PORGY. WHILE LARGER
 JUVENILES, 130 TO 162 MM TOTAL LENGTH, INGESTED SIMILAR FOODS AS
 ADULTS. SMALL JUVENILES, 46-64 MM, FED ON AMPHIPODS, COPEPODS, AS
 STOMATOPODS, & ANNELIDS. SLIGHT DIFFERENCES IN FREQUENCY OF OCCUR
 RENCE OF ORGANISMS IN THE DIET WERE NOTED BETWEEN GEOGRAPHICAL
 AREAS, DEPTHS, & SEASONS. SIZE OF RED PORGY PRODUCED A MORE
 PRONOUNCED EFFECT ON THE DIET.

MCEACHRAN, J.D., D.F. BOESCH AND J.A. MUSICK
 1976. DIVISION WITHIN TWO SYMPATRIC SPECIES-PAIRS OF SKATES
 (PISCES: RAJIDAE)
 MAR BIOD 35: 301-317

FOOD HABITS OF TWO SYMPATRIC SPECIES-PAIRS OF SKATES (RAJA ERINACEA - R. OCELLATA & R. RADIIATA - R. SENTIA), WHICH OCCUR OFF THE EAST COAST OF NORTH AMERICA WERE INVESTIGATED. STOMACHS FROM OVER 1600 SPECIMENS OF THE 4 SPECIES WERE COLLECTED DURING WINTER, SUMMER, & AUTUMN OF 1969 & THE WINTER OF 1970. DIETS OF R. ERINACEA & R. OCELLATA CONSISTED LARGELY OF AMPHIPODS, DECAPOD CRUSTACEANS & POLYCHAETES. HOWEVER, R. OCELLATA CONSUMED RELATIVELY MORE FISHES & POLYCHAETES & LESS SPECIES BUT IN DIFFERENT PROPORTIONS. R. SENTIA & R. RADIIATA TENDED TO FEED ON INFAUNA & R. ERINACEA TENDED TO FEED ON EPIFAUNA. FOOD PREFERENCES OF THE TWO SPECIES MAY BE CORRELATED WITH THE DIFFERENCE IN SHAPE OF THE MOUTH & NUMBER OF TOOTH ROWS. R. RADIIATA & R. SENTIA BOTH FED HEAVILY ON DECAPOD CRUSTACEANS & EUPHAUSIDS, BUT POLYCHAETES WERE RELATIVELY MORE IMPORTANT TO R. RADIIATA & MYXIDS WERE RELATIVELY MORE IMPORTANT TO R. SENTIA. R. RADIIATA HAD A VERY DIVERSIFIED DIET & FED ON BOTH EPIFAUNA & INFAUNA. THE DIET OF R. SENTIA WAS VERY RESTRICTED & CONSISTED ALMOST ENTIRELY OF EPIFAUNA. DIETS OF THE TWO SPECIES-PAIRS WERE SIMILAR, BUT ISOPODS & BIVALVES WERE MORE IMPORTANT TO THE ERINACEA - R. OCELLATA PAIR & EUPHAUSIDS & MYXIDS WERE MORE IMPORTANT TO THE R. RADIIATA - R. SENTIA PAIR. THESE DIFFERENCES REFLECT DIFFERENCES IN THE BENTHIC COMMUNITIES WITH WHICH THE SPECIES-PAIRS ARE ASSOCIATED. AMOUNT OF OVERLAP IN RESOURCE UTILIZATION OF THE PAIRS OF SKATES WAS COMPARED WITH THAT OF SOME OTHER CONGENERIC ORGANISMS.

MCILWAIN, T.D. NO. 72
 1970. STOMACH CONTENTS AND LENGTH-WEIGHT RELATIONSHIPS OF CHAIN PICKEREL
 (ESOX NIGER) IN SOUTH MISSISSIPPI WATERS
 TRANS AM FISH SOC 99(2): 439-440.

FOOD WAS FOUND IN 54 PERCENT OF 108 PICKEREL STOMACHS AND, ALTHOUGH
 66 DIFFERENT ORGANISMS WERE EATEN BY 58 FISH, ONLY THREE STOMACHS
 CONTAINED MORE THAN ONE FOOD ITEM. THE THREE DOMINANT FOOD ITEMS
 WERE LARGEMOUTH BASS (MICROPTERUS SALMOIDES), STRIPED MULLET
 (MUGIL CEPHALUS) AND BLUEGILL (LEPOMIS MACROCHIRUS). ALTHOUGH LARGE
 POPULATIONS OF SOFT-RAYED FISH SUCH AS BLACKTAIL REDHORSE
 (MOXOSTOMA POECILURUM) AND SHARPFIN CHUBSUCKER (ERIMYZON TENUIS) ARE
 PRESENT IN THESE RIVER SYSTEMS, 38.8 PERCENT OF THE IDENTIFIABLE
 FISH WERE CENTRACHIDS.

MERRINER, J. V. NO. 23
1975. HABITS OF THE WEAKFISH, CYNOScion REGALIS, IN NORTH
CAROLINA WATERS
CHESAPEAKE SCI 16(1): 74-76

THE DOMINANT FOOD ITEMS IN 817 STOMACHS OF WEAKFISH COLLECTED IN
NORTH CAROLINA WATERS FROM 1967 TO 1970 WERE PENAEID & MYSID
SHRIMPS, ANCHOVIES, & CLUPEID FISHES. DOMINANCE OF VARIOUS FOOD
ITEMS SHIFTED DEPENDING UPON THE TECHNIQUE USED TO DESCRIBE FOOD
HABITS: PERCENT OCCURRENCE, PERCENT NUMBER, OR PERCENT VOLUME. AGE
O WEAKFISH FED PRIMARILY ON SHRIMP & ANCHOVY. IN AGE 1 FISH,
SHRIMP & ANCHOVY CONTINUED TO DOMINATE THE FOOD THOUGH OTHER
FISHES APPEARED IN THE DIET. IMPORTANCE OF SHRIMP IN THE DIET
DECREASED FROM AGE II ON. OLDER WEAKFISH FED UPON THE CLUPEID
SPECIES THAT WERE DOMINANT IN A GIVEN AREA.

MOFFETT, A.W., L.W. MCEACHRON AND J.G. KEY
1979. NO. 70
AN ANNOTATED BIBLIOGRAPHY FOR SAND SEATRUT, CYNOSCION ARENARIUS
TECH SER, TEXAS PARKS AND WILDLIFE DEPT., MARSHALL, TX 28:1-13

MOFFETT, A.W., L.W. MCEACHRON AND J.G. KEY
1979. NO. 24
OBSERVATIONS ON THE BIOLOGY OF SAND SEATRUT, CYNOSCION ARENARIUS
IN GALVESTON AND TRINITY BAYS, TEXAS
CONT MAR SCI 22: 163-172

SAND SEATRUT (CYNOSCION ARENARIUS) IS OF COMMERCIAL & BEHAVIOR,
RECREATIONAL IMPORTANCE TO THE GULF STATES. SPawning LENGTH -
FEEDING HABITS, LENGTHWEIGHT RELATIONSHIPS & STANDARD LENGTH -
TOTAL LENGTH RELATIONSHIPS WERE DETERMINED FOR 498 SAND SEATRUT
COLLECTED BETWEEN MAY 1966 & MARCH 1968 FROM GALVESTON & TRINITY
BAYS, TEXAS & FROM THE GULF OF MEXICO NEAR GALVESTON ISLAND. SAND
SEATRUT DISTRIBUTION, GONADAL DEVELOPMENT & THE TIME YOUNG-OF-THE
YEAR APPEARED IN ESTUARIES INDICATED THAT THIS SPECIES SPAWNS NEAR
GULF-TO-BAY PASSES IN THE GULF OF MEXICO BETWEEN MARCH & AUGUST
WITH A SPAWNING PEAK DURING SPRING. FISH & CRUSTACEANS DOMINATED
THE DIET OF SAND SEATRUT, CRUSTACEANS OCCURRED MORE FREQUENTLY IN
FISH <160 MM SL & FISH PREDOMINATED IN THOSE >160 MM SL. THE
LENGTH-WEIGHT REGRESSIONS DERIVED FROM 267 SAND SEATRUT 125-375
MM SL DIFFERED BETWEEN SEXES. THE STANDARD LENGTH-TOTAL LENGTH
RELATIONSHIP WAS $TL = 0.7 + 1.1 SL$.

MOORE, J.W., AND I.A. MOORE
 1976. NO. 28
 THE BASIS OF FOOD SELECTION IN FLOUNDERS, *PLATICHTHYS FLESUS*(L.),
 IN THE SEVERN ESTUARY
 J FISH BIOL 9(1): 139-156

THE FACTORS INFLUENCING THE SELECTION OF FOOD BY FLOUNDERS, *PLATICHTHYS FLESUS* (L.), HAVE BEEN INVESTIGATED BY ANALYSING COLLECTIONS MADE IN THE SEVERN ESTUARY FOR 1 YEAR & THE RESULTS OF EXPERIMENTS. FLOUNDERS MEASURING BETWEEN 6.0 & 35 CM FED HEAVILY ON THE POLYCHAETE NEREIS DIVERSICOLOR IN FEBRUARY & ON THE AMPHIPOD GAMMARUS SALINUS BETWEEN FEBRUARY & APRIL. THEREAFTER THESE SPECIES WERE REPLACED BY THE MYSID NEOMYSIS & APRIL. THEREAFTER THE DECAPOD CRANGON VULGARIS. FLOUNDERS SHORTER THAN 6.0 CM, FED MAINLY ON NEOMYSIS INTEGER REGARDLESS OF MONTH. NUMEROUS FACTORS WERE INVOLVED IN THE CHOICE OF THE FOOD INCLUDING (1) THE MAXIMUM & MINIMUM LENGTH OF PREY, (2) ITS SPATIAL DISTRIBUTION IN THE WATER COLUMN, (3) ITS DEGREE OF CONCEALMENT, (4) ITS MOTILITY & ABILITY TO ESCAPE PREDATION, (5) CONDIG SPEED & (7) THE TURBIDITY & TEMPERATURE OF THE WATER. ALTHOUGH THE AVERAGE LENGTH OF INGESTED PREY REMAINED UNCHANGED AS THE FISH GREW IN SIZE, AN INCREASE IN THE MAXIMUM & MINIMUM LENGTHS WAS OBSERVED. THE PERCENTAGE OF STOMACHS THAT CONTAINED NO IDENTIFIABLE REMAINS IN FLOUNDERS GREATER THAN 6.0 CM AVERAGED 80-95% DURING PART OF THE WINTER & 60% IN THE SUMMER & BETWEEN JANUARY & MARCH. THESE CHANGES PARTLY REFLECTED THE INFLUENCE OF LOW WATER TEMPERATURE ON THE METABOLIC RATE & AVAILABILITY OF PREY. THE DRY WEIGHT OF THE STOMACH CONTENTS IN FLOUNDERS LONGER THAN 6.0 CM WAS LOWEST IN WINTER BUT HIGH VALUES WERE RECORDED IN THE SPRING. THIS LATTER FEATURE WAS PROBABLY BECAUSE THE RATE OF FEEDING WAS GREATER THAN THAT OF DIGESTION. DURING THE SUMMER, CONTENTS REMAINED NORMALLY FEEDING CONDITIONS. THE WEIGHT OF THE STOMACHS REMAINED SHORTER THAN 6.0 CM ALWAYS CONTAINED MORE FOOD IN THEIR STOMACHS ON A UNIT WEIGHT BASIS THAN LARGER INDIVIDUALS, REFLECTING METABOLIC RATE & HUNTING EFFICIENCY.

MOORE, J.W., AND MOORE, I.A.
 1976. BASIS OF FOOD SELECTION IN SOME ESTUARINE FISHES. EEL, ANGUILLA
 & STICKLEBACK, GASTROSTEUS ACULEATUS HAVE BEEN INVESTIGATED BY
 ANALYSING COLLECTIONS MADE IN THE SEVERN ESTUARY FOR 1 YR. NON-MI-
 GRATORY (YELLOW) EELS MEASURING FROM 19.5-56.5 CM IN LENGTH FED
 MAINLY ON EITHER THE DECAPOD CRANGON VULGARIS OR ON THE MYSID NEO
 MYSIS. INTEGER DURING THE WARMER MONTHS BUT CEASED TO FEED IN THE
 WINTER. WHITING MEASURING BETWEEN 2.5 & 15 CM FED ALMOST EXCLUSI-
 VELY ON C. VULGARIS, N. INTEGER ON EITHER THE AMPHIPOD GAMMARUS
 MINUTUS. SPRATS FEED CHIEFLY ON EITHER THE AMPHIPOD GAMMARUS
 SALINUS OR N. INTEGER. STICKLEBACKS SELDOM CONTAINED ANY FOOD IN
 THEIR STOMACHS DESPITE THE PRESENCE OF LARGE QUANTITIES OF SUIT-
 ABLE PREY & THE HIGH LEVEL OF HUNTING EFFICIENCY. GAMMARUS
 SALINUS, ALTHOUGH NORMALLY ABUNDANTLY CONCEALED AMONG FLOATING
 FISHERIES EXCEPT SPRATS REFLECTING ITS SMALL SIZE & THE UNUSUALLY EFFICIENT ESCAPE
 CAUSE OF THE LIMITATIONS OF SIZE & THE UNUSUALLY EFFICIENT ESCAPE
 REACTION OF LARGER ANIMALS, ONLY YOUNG REPRERESENTATIVES OF CRANGON
 VULGARIS WERE CAPTURED. THE ISOPOD EURYDICE PULCHRA WAS RARELY
 EATEN BY ANY OF THE FISHES EVEN THOUGH IT WAS COMMON IN THE ENVIRO-
 NMENT. BURROWING POLYCHAETES, MAINLY NEREIS DIVERSICOLOR, WERE
 NEVER UTILIZED POSSIBLY DUE TO THE DIFFICULTY INVOLVED IN REMOVING
 THESE ORGANISMS FROM THE SUBSTRATE. NEOMYSIS INTEGER WAS THE MOST
 FREQUENTLY CONSUMED ORGANISM. ALTHOUGH THE AVERAGE LENGTH OF PREY
 REQUESTED BY THE WHITINGS INCREASED WITH THE SIZE OF FISH, THIS WAS
 NOT THE CASE FOR THE OTHER SPECIES. THE PROPORTION OF NON-FEEDING
 EELS & THE DRY WEIGHT OF STOMACH CONTENTS OF THIS SPECIES DE-
 PENDED ON THE TEMPERATURE OF THE WATER BUT WERE NOT RELATED TO THE
 AVAILABILITY OF PREY & TIDAL CONDITIONS WHEREAS THE FEEDING OF
 WHITING COULD NOT BE RELATED TO ANY ENVIRONMENTAL PARAMETER.

MULKANA, M. S.

NO. 30

THE GROWTH AND FEEDING HABITS OF JUVENILE FISHES IN TWO RHODE ISLAND ESTUARIES
GULF RES REP 2(2): 97-168

THE BASIC PURPOSE OF THIS WORK WAS TO GAIN INFORMATION ON THE POSSIBLE ROLE OF SOME RHODE ISLAND ESTUARIES AS NURSERY GROUNDS FOR YOUNG MIGRANT & RESIDENT SPECIES OF FISHES. THE AREAS SELECTED WERE THE LOWER PETTAQUAMSCUTT RIVER & THE LOWER POINT JUDITH POND BOTH IN THE TOWN OF NARRAGANSETT, RHODE ISLAND. THE SEINING OPERATIONS WERE CARRIED THROUGH SUMMER & EARLY FALL OF 1962 WHEN THESE ESTUARIES ARE HEAVILY USED AS NURSERY GROUNDS. MAJOR FEATURES OF THE OCCURRENCE, ABUNDANCES & DISTRIBUTION OF YOUNG FISHES WERE DEDUCED BY EXAMINING SAMPLES FROM SEINE HAULS. THIRTY-SIX SPECIES WERE RECORDED FROM THE LOWER RIVER WHILE ONLY TWENTY-FOUR SPECIES OCCURRED IN THE LOWER POND. THE ABUNDANCE OF FISHES ROSE WITH A RISE IN TEMPERATURE & DECLINED WITH DECREASING TEMPERATURE, BUT NO CORRELATION WAS OBSERVED BETWEEN MAXIMUM TEMPERATURE & MAXIMUM NUMBER OF INDIVIDUALS OCCURRING AT ANY TIME. THE NUMBER OF SPECIES & THE ABUNDANCE OF INDIVIDUAL FISH WERE HIGHEST AT THE SEAWARD STATION (STA. II) IN THE LOWER RIVER. AMONG THE SELECTED SPECIES, THE ABUNDANCE OF MENIDIA MENIDIA WAS TWO TO THREE TIMES HIGHER AT MIDDLE BRIDGE (STA. II) THAN AT ANY OTHER STATION. THE BEHAVIOR OF PSEUDOPLEURONECTES AMERICANUS, REVDOORTIA TYRANNUS OBSERVED AT LAND TOWNS, & THE MIGRANT SPECIES, BREVOORTIA TYRANNUS GREW AT THE RATE OF 10 MM PER MONTH, BUT EXHIBITED NO VARIATION IN GROWTH IN THE TWO ESTUARINE SYSTEMS. THE POPULATION RATE THAT WAS ALMOST TWICE THAT OF PETTAQUAMSCUTT RIVER HAD A GROWTH JUDITH POND. THE GROWTH RATE OF THESE SPECIES IN THE LOWER ISLAND WATERS COMPARE FAVORABLY WITH SIMILAR DATA FROM OTHER STUDIES. THE JUVENILE MENIDIA DEMONSTRATED A HIGHER RATE OF GROWTH AT SEAWARD STATIONS IN BOTH THE AREAS, ESPECIALLY IN THE LOWER RIVER. FORTY-THREE TYPES OF PREY ORGANISMS BELONGING TO DIVERSE TAXONOMIC GROUPS WERE IDENTIFIED FROM STOMACH CONTENTS OF P. AMERICANUS & THIRTY-NINE TYPES WERE NOTED IN THE GUT CONTENTS OF M. MENIDIA. ANALYSIS OF THE DEGREE OF FULLNESS INDICATED MARKEDLY HIGH PERCENTAGE OF FULL STOMACHS IN THE TWO STUDY AREAS. *

NAQVI, S.M.Z. NO. 60
EFFECTS OF PREDATION ON INFAUNAL INVERTEBRATES OF ALLIGATOR
HARBOR, FLORIDA.
GULF RES REP 2: 213-321

A STUDY OF THE EFFECT OF PREDATION ON INFAUNAL INVERTEBRATES WAS CARRIED OUT FROM JULY, 1965, TO JANUARY, 1966, WITHIN THE INTERTIDAL ZONE OF FLORIDA STATE UNIVERSITY MARINE LABORATORY AREA AT ALLIGATOR HARBOR, LOCATED ON THE NORTHEAST GULF OF MEXICO. THE ANIMALS WERE OFFERED PROTECTION BY WIRE-BASKETS OF THREE, 800 DIFFERENT MESH SIZES. OUT OF 1,112 INFAUNAL INVERTEBRATES, 800 WERE RECOVERED INSIDE & 312 OUTSIDE THE BASKETS. THE POLYCHAETES, NEMERTINES, PHORONIDS, AMPHIPODS & BIVALVES MADE UP THE INFAUNA; THE POLYCHAETES COMPRISED THE MAJOR PART OF IT. OUT OF 34 SPECIES OF POLYCHAETES, SIX ARE REPORTED FROM THIS AREA FOR THE FIRST TIME. THE SPAWNING PERIOD OF TWO SPECIES OF POLYCHAETES & ONE GASTROPOD WAS ALSO OBSERVED, & THE SEASONAL ABUNDANCE OF ALL POLYCHAETES WAS NOTED. THE DEPTH PREFERENCE OF INFAUNAL ORGANISMS WAS DETERMINED.

ODUM, W.E. NO. 31
1968. ECOLOGICAL SIGNIFICANCE OF FINE PARTICLE SELECTION BY THE
THE STRIPED MULLET, MUGIL CEPHALUS.
LIMNOL OCEANOGR 13(1): 92-98

BY TRACER EXPERIMENTS USING P & A COMPARISON OF SEDIMENT & STOMACH
CONTENT PARTICLE SIZES, MUGIL CEPHALUS LINNEUS IS SHOWN TO PREFER
VERY FINE PARTICLES WHERE SEDIMENTS ARE INVOLVED IN FEEDING.
IT IS SUGGESTED THAT THESE SMALL INORGANIC & PLANT DETRITAL SERIAL
MENT PARTICLES ARE MUCH RICHER BOTH IN ABSORBED ORGANISMS THAN THE
& IN ADSORBED BACTERIA, PROTOZOA, REJECTS. THIS SELECTIVITY RESULTS
IN SUBSTANTIALLY HIGHER ORGANIC VALUES OF THE STOMACH CONTENTS
THAN OF THE SEDIMENTS.

OVERSTREET, R.M. AND R.W. HEARD
1978. NO. 33
FOOD OF THE ATLANTIC CROAKER, MICROPOGONIAS UNOLATUS, FROM
MISSISSIPPI SOUND AND THE GULF OF MEXICO
GULF RES REP 6(2): 145-152

THE DIET OF THE ATLANTIC CROAKER FROM MISSISSIPPI SOUND HAS BEEN
EXAMINED FOR THE FIRST TIME. OVER 83 TAXA WERE ENCOUNTERED, OR
MORE THAN WERE REPORTED FROM CROAKER IN ANY OTHER REGION. WE ALSO
FOUND 60 TAXA, 36 OF WHICH OVERLAPPED WITH THE ABOVE, IN CROAKER
FROM VARIOUS OFFSHORE STATIONS IN THE GULF OF MEXICO. IN MISS.
SOUND THE FREQUENCY OF OCCURRENCE OF ITEMS REVEALED PRIMARILY CRUS-
TACEANS & POLYCHAETES, MOLLUSCS, FISHES, & LESS COMMON
ITEMS, IN THE OPEN GULF, MOLLUSCS APPEARED SLIGHTLY MORE OFTEN
THAN IN INSHORE CROAKER & THAN POLYCHAETES IN OFFSHORE FISH. THE
DIETS WERE ASSESSED ACCORDING TO LENGTH OF FISH, SEASON, DEPTH OF
WATER, & LOCALITY.

OVERSTREET, R.M., AND R.W. HEARD
 NO. 32
 1978. OF THE RED DRUM, SCIAENOPS OCELLATA, FROM MISSISSIPPI SOUND
 GULF RES REP 6(2): 131-135

EXAMINED DIGESTIVE TRACTS OF THE RED DRUM IN MISSISSIPPI SOUND FOR 34
 CONTAINED MOSTLY DECAPOD CRUSTACEANS. CRUSTACEANS ACCOUNTED FOR 34
 OF 59 ENCOUNTERED TAXA, MORE THAN REPORTED FROM ANY OTHER REGIONS. OUT
 NEVER THELESS, THE GENERAL DIET FOR THAT REGION WITH FOOD CONTENTS OUT
 OF THE 107 EXAMINED IS SIMILAR TO AREAS. AS REPORTED FOR RED DRUM IN ANS
 SEVERAL OTHER STUDIES FROM OTHER AREAS. IN ADDITION TO CRUSTACEANS
 FISHES FOLLOWED BY POLYCHAETES WITH THE MOST IMPORTANCE ITEMS
 (IN 99, 43, & 15% RESPECTIVELY). BLUE PENAIDS
 OCCURRED IN EVEN MORE DRUM SPECIES WERE ALSO EXAMINED; UNLIKE
 SHRIMPS. OTHER COMMERCIAL BEACHES WERE ALSO EXAMINED; BUT
 THOSE LARGE DRUM FROM GEORGIA BEACHES WERE ALSO EXAMINED; BUT
 NOT POLYCHAETES OR PENAEIDS. WE SUGGEST THAT THE RED DRUM'S MIGRA
 TIONS MAY BE REGULATED BY OPTIMAL ABUNDANCE OF SPECIFIC TYPES OF
 DIETARY ORGANISMS.

PARKER, J.C. NO. 82
 BIOLOGY OF THE SPOT (LEIOSTOMUS XANTHURUS) AND ATLANTIC CROAKER
 (MICROPOGON UNDULATUS) IN TWO GULF OF MEXICO NURSERY AREAS
 AGRI EXT SERV TEXAS A&M UNIV, SEA GRANT PUB TAMU-56-71-210

THE DISTRIBUTION OF SPOT AND ATLANTIC CROAKER IN THE VICINITY OF
 LAKE BORGNE, LOUISIANA AND GALVESTON BAY, TEXAS WAS DETERMINED IN
 RELATION TO TEMPERATURE, SALINITY, AND CERTAIN HYDROGRAPHIC
 FEATURES. GEOGRAPHIC VARIATIONS IN SPAWNING, GROWTH RATES,
 DISTRIBUTION AND FOOD HABITS WERE EVALUATED. LENGTH-WEIGHT
 RELATIONSHIPS WERE COMPARED BETWEEN THE TWO AREAS, AND IN
 GALVESTON BAY, CONDITION OF FISH WAS STUDIED IN RELATION TO SIZE
 OF FISH, HABITAT, SEASON, TEMPERATURE, AND SALINITY.
 SPOT AND CROAKER WERE FOUND TO BE IN DIRECT COMPETITION FOR
 FOOD IN BOTH STUDY AREAS. THE DEGREE TO WHICH THIS COMPETITION
 AFFECTS THE ABUNDANCE OF THESE SPECIES IS NOT KNOWN. IN THE LAKE
 BORGNE AREA, SPOT WERE MORE ABUNDANT THAN CROAKERS IN SUBAREA III,
 ABUNDANCE WAS ABOUT EQUAL IN SUBAREA II, AND CROAKER WERE MORE
 ABUNDANT THAN SPOT IN SUBAREA I. THE NUMBER AND BIOMASS OF THE
 CROAKER IN GALVESTON BAY FAR EXCEEDED THAT SPOT THROUGHOUT THE
 SYSTEM. IT WAS NOT POSSIBLE TO DETECT THE FACTORS RESPONSIBLE
 FOR THESE DIFFERENCES, BUT AVAILABILITY OF FOOD MUST SURELY HAVE
 BEEN INVOLVED. *

PEARCY, W.G. AND D. HANCOCK
NO. 67

FEEDING HABITS OF MICROSTOMUS PACIFICUS; GLYPTOCEPHALUS ZACHIRUS;
AND CITHARICHTHYS SORDIDUS, IN A REGION OF DIV. SED. AND BATHYMETRY
FISH BULL 76(3): 641-651

THE FEEDING HABITS OF THE DOVER SOLE & REX SOLE (MAINLY JUVENILES) & OF SLENDER SOLE & PACIFIC SANDDAB WERE INVESTIGATED AT SEVEN STATIONS ON THE CONTINENTAL SHELF OFF CENTRAL OREGON. DOVER SOLE HAD A CATHOLIC DIET, FEEDING ON A LARGE VARIETY OF INFAUNAL & EPIFAUNAL INVERTEBRATES. THE COMPOSITION OF THE DIET VARIED AMONG STATIONS OF DIFFERENT DEPTH & SEDIMENT TYPE INDICATING OPPORTUNISTIC FEEDING. PELECYPODA WERE THE MOST IMPORTANT PREY ON A WEIGHT BASIS AT THE SHALLOW STATION (74M) OF WELL-SORTED SAND WHERE THEY WERE THE DOMINANT MACROFAUNAL INVERTEBRATE. OPHIUROIDS, SEA PENS, ANEMONES, & PELECYPODS WERE THE MOST IMPORTANT PREY AT 100-102M STATIONS OF SILTY SAND OR SANDY SILT. POLYCHAETES COMPOSED OVER 90% OF THE DIET AT THE DEEP STATIONS (148-195M) OF CLAYEY SILT OR SILTY SAND. THE AVERAGE STANDING STOCKS PER SQUARE METER OF DOVER SOLE CAUGHT IN BEAM TRAWL COLLECTIONS & POLYCHAETES IN GRAB SAMPLES WERE POSITIVELY CORRELATED AMONG STATIONS. SIMILARITY OF THE FOOD HABITS OF DOVER SOLE ON THE BASIS OF FOOD WEIGHT OR FREQUENCY OF OCCURRENCE WAS GENERALLY HIGHER AMONG STATIONS OF SIMILAR DEPTH THAN OF SIMILAR SEDIMENT TEXTURE. SIMILAR TRENDS WERE NOTED FOR ASSEMBLAGES OF BENTHIC FISHES & INVERTEBRATES. DOVER SOLE COLLECTED DURING THE WINTER HAD THE HIGHEST PERCENTAGE OF EMPTY STOMACHS, THE FEWEST PREY TAXA, & OFTEN THE LOWEST FREQUENCY OF OCCURRENCE OF PREY TAXA WITHIN A SIZE GROUP. BECAUSE SEASONAL VARIATIONS WERE NOT OBSERVED IN ABUNDANCE OF MACROFAUNAL FOOD IN THE SEDIMENTS, AVAILABILITY OF PREY MAY CHANGE WITH SEASON, OR MORE LIKELY, DOVER SOLE FEED MORE INTENSELY & LESS SELECTIVELY DURING SUMMER. SMALL (<150MM STANDARD LENGTH) REX SOLE FED MAINLY ON AMPHIPODS & OTHER CRUSTACEANS. LARGE (150-450MM STANDARD LENGTH) REX SOLE PREYED CHIEFLY ON POLYCHAETES. THE DIET OF REX SOLE WAS LESS DIVERSE THAN THAT OF THE DOVER SOLE & OVERLAP OF DIET BETWEEN THE TWO SPECIES WAS NOT LARGE. BOTH THE PACIFIC SANDDAB, NUMERICALLY THE MOST COMMON SPECIES OF FISH AT THE SHALLOW SAND STATION, & THE SLENDER SOLE, THE MOST COMMON SPECIES AT THE THREE DEEP, SOFT-SEDIMENT STATIONS, PREYED PRINCIPALLY ON PELAGIC CRUSTACEANS, SUCH AS EUPHAUSIIDS,

POWELL, A.B. AND F.J. SCHWARTZ
1979. NO. 46
FOOD OF PARALICHTHYS DENTATUS AND P. LETHOSTIGMA (PISCES: BOTHIDAE)
IN NORTH CAROLINA ESTUARIES
ESTUARIES 2(4): 276-279.

THE DIETS OF THE SPATIALLY SEGREGATED SUMMER FLOUNDER, IN
PARALICHTHYS DENTATUS, & SOUTHERN FLOUNDER, P. LETHOSTIGMA, IN
PAMLICO SOUND, NORTH CAROLINA, WERE COMPOSED OF CRUSTACEANS &
FISHES. YOUNG FLOWNERS FED MAINLY ON MYSIDS & FISHES THROUGHOUT
THE YEAR, BUT THE RATIOS OF THESE ITEMS DIFFERED BETWEEN SPECIES.
FEEDING WAS MINIMAL DURING WINTER, BUT SUMMER FLOUNDER FROM NEAR-
INLET STATIONS HAD A HIGH FREQUENCY OF STOMACHS WITH FOOD. OLDER
SUMMER FLOUNDER FED EQUALLY ON SHRIMP & FISHES, WHILE SOUTHERN
FLOUNDER FED ALMOST SOLELY ON FISHES. THIS DIFFERENCE WAS PROBABLY
RELATED TO FOOD AVAILABILITY.

RICHARDS, S.W. NO. 6
 1976. GROWTH, AND FOOD OF BLUEFISH (POMATOMUS SALTATRIX) FROM
 EAST-CENTRAL LONG ISLAND SOUND FROM JULY THROUGH NOVEMBER 1975
 TRANS AM FISH SOC 105(4): 523-525.

AGE & GROWTH WERE ANALYZED FROM SCALES OF 64 BLUEFISH TAKEN FROM
 EAST-CENTRAL LONG ISLAND SOUND DURING MID-JULY TO MID-NOVEMBER
 1975. AGES RANGED FROM 2+ TO 7+ YEARS; FORK LENGTHS RANGED FROM 44
 TO 76 CM. NO CONSISTENT DIFFERENCES WERE NOTED BETWEEN THE SEXES.
 BACK-CALCULATIONS FROM SCALE READINGS INDICATED THAT MEAN FORK
 LENGTHS, IN CENTIMETERS, FOR EACH YEAR WERE: 23 AT 1+ YEAR; 40 AT
 2+ YEARS; 49 AT 3+; 48 AT 4+; 64 AT 5+; 69 AT 6+; & 71 AT 7+ YEAR.
 WEIGHT IN GRAMS DOUBLED FROM 1,800 AT 3+ YEARS TO 4,100 AT 5+
 YEARS, INCREASING TO 5,500 AT 7+ YEARS. SIXTY-SEVEN BLUEFISH ATE
 LOLLIGO PEALI (SQUID) & SEVEN SPECIES OF FISH: BREVOORTIA TYRANNUS,
 ANCHOA MITCHILLI, PEPRILUS TRIACANTHUS, ETIRMEUS TERES, ALOSA
 PSEUDOHARENGUS, MERLUCCIIUS BILINEARIS, & POMATOMUS SALTATRIX. WITH
 THE EXCEPTION OF MENHADEN, ALL PREY WERE OF SMALL SIZE, RANGING IN
 LENGTH BETWEEN 5 & 20 CM.

RICHARDS, S.W., J.M. MANN AND J.A. WALKER

1979. COMPARISON OF SPAWNING SEASONS, AGE, GROWTH RATES, AND FOOD OF TWO SYMPATRIC SPECIES OF SEAROBINS, *PRIONOTUS CAROLINUS* ESTUARIES 2(4): 255-268

PRIONOTUS CAROLINUS & *PRIONOTUS EVOLANS* WERE COLLECTED FROM MANY LOCATIONS WITHIN LONG ISLAND SOUND IN 1971-1973, & IN 1976-1977. DATA FROM EARLIER COLLECTIONS IN BLOCK ISLAND SOUND (1943-1945) WERE ALSO INCLUDED. A TOTAL OF 1751 SPECIMENS, 960 *P. CAROLINUS* & 791 *P. EVOLANS* WAS EXAMINED WITHIN THESE TWO TIME PERIODS. BOTH SPECIES ENTERED THE SOUND IN APRIL & SPAWNED DURING JUNE & JULY. *P. CAROLINUS* APPEARED TO SPAWN SLIGHTLY EARLIER IN SUMMER THAN *P. EVOLANS*. ADULTS BEGAN TO LEAVE THE SOUND AFTER SPAWNING & WERE USUALLY ABSENT AFTER NOVEMBER. YOUNG-OF-THE-YEAR WERE TAKEN REGULARLY FROM AUGUST TO NOVEMBER & OCCASIONALLY IN WATER OVER 20 MT DEEP, INTO FEBRUARY WHEN THE BOTTOM WATER TEMPERATURE WAS 1.4 C. AT THE END OF THE FIRST GROWING SEASONS BOTH SPECIES EXHIBITED LARGE VARIATIONS IN STANDARD LENGTHS. BACK-CALCULATIONS FROM SCALE ANNUAL MEASUREMENTS INDICATED THAT LINEAR GROWTH RATES DURING THE JUVENILE YEARS WERE SIMILAR IN BOTH SPECIES. HOWEVER, *P. EVOLANS* WAS CONSIDERABLY HEAVIER THAN *P. CAROLINUS*. DURING ADULTHOOD *P. EVOLANS* WAS NOT ONLY LONGER & HEAVIER THAN *P. CAROLINUS*, BUT LIVED LONGER. GROWTH RATES ARE DESCRIBED BY THE FOLLOWING EQUATIONS: $P. CAROLINUS$ $LT+1 = 9.60 + 0.68(LT)$, & $P. EVOLANS$ $LT+1 = 7.70 + 0.80(LT)$. BOTH SPECIES WERE OPPORTUNISTIC FEEDERS, & CRUSTACEANS WERE CLEARLY THE DOMINANT GROUP OF PREY. YOUNG-OF-THE-YEAR, BETWEEN 3-6CM, ATE COPEPODS. AS THEY GREW THEY ATE LARGER PREY, SUCH AS NEOMYSIS AMERICANA, DIASTYLIS QUADRISPINOSUS, VARIOUS SPECIES OF AMPHIPODS OF SMALL SIZES, & JUVENILE CRANGON SEPTENTRIONALIS. OLDER FISH ATE LARGER SIZES OF THESE SAME PREY, A NUMBER OF SPECIES OF CRABS, JUVENILE HOMARUS AMERICANUS, & SQUILLA EMPUSA. OCCASIONALLY THEY ATE POLYCHAETES, MOLLUSCS, & JUVENILE FISH. PARTITIONING OF THE RESOURCES OF LONG ISLAND SOUND BY THESE TWO SPECIES APPEARED TO BE BY PREY SIZE. *P. EVOLANS* ATE PREY THAT, ON THE AVERAGE, WERE SLIGHTLY LARGER THAN THOSE EATEN BY *P. CAROLINUS*. FURTHERMORE, *P. EVOLANS* ATE A GREATER AMOUNT OF NEKTONIC SPECIES THAN *P. CAROLINUS* WHICH APPEARED TO PREFER BENTHONIC INVERTEBRATES.

RINGLER, N. H. NO. 73
 1978. SELECTION BY BENTHIC FEEDERS
 STROUD & CLEPPER (EDS) SYMP PRED-PREY SYST FISH MGMT, ATL, GA: 219-229

PREY SIZE, DISTRIBUTION AND ABUNDANCE PLAY A CENTRAL ROLE IN DIET
 SELECTION. OPTIMAL FORAGING THEORY PROVIDES GENERAL PREDICTIONS
 OF PREY SUITABILITY IN TERMS OF TIME OR ENERGY, AND SUCH
 PREDICTIONS PROVIDE GUIDANCE IN STUDIES OF PROXIMATE MECHANISMS
 OF PREY SELECTION. CONSIDERABLE EVIDENCE SUGGESTS THAT BENTHIC
 FEEDERS ARE SIZE-SELECTIVE. THEY ALSO APPEAR CAPABLE OF LOCATING
 AREAS OF PREY-ABUNDANCE, AND FORAGING BEHAVIOR MAY BE
 CONTROLLED BY A CRITICAL RATE OF FOOD CAPTURE. SELECTIVE
 PREDATION HAS BEEN SHOWN TO INCREASE FOOD INTAKE RELATIVE
 TO RANDOM FEEDING, ALTHOUGH SEVERAL DAYS MAY BE REQUIRED TO
 LEARN THE APPROPRIATE RESPONSES. ENVIRONMENTAL FACTORS
 INFLUENCE PREY SELECTION BY BENTHIC FEEDERS. RATES OF
 GASTRIC EVACUATION AND FORAGING ACTIVITY INCREASE WITH
 TEMPERATURE IN FISHES AS DOES THE DEGREE OF EXPOSURE OF
 AQUATIC INVERTEBRATES. INDIVIDUAL FISH MAY BECOME
 ACCLIMATED TO FEED WITHIN NARROW LIMITS OF TEMPERATURE
 AND DISSOLVED OXYGEN, WHICH ACTS TO PARTITION THEIR
 FEEDING IN TIME AND SPACE. THE COMPLEXITY OF BENTHIC
 ENVIRONMENTS HAS BEEN SHOWN TO INFLUENCE PREDATION
 INTENSITY AND EXTENT OF SIZE SELECTIVITY.*

ROELOFS, E. W. NO. 77
 1954. STUDIES OF YOUNG SCIAENID FISHES, MICROPOGON AND LEIOSTOMUS
 FOOD FROM NORTH CAROLINA
 COPEIA 1954(2): 151-153

FOOD HABITS OF YOUNG ATLANTIC CROAKER, MICROPOGON UNDULATUS, AND
 SPOT, LEIOSTOMUS XANTHURUS, WERE EXAMINED FOR SPECIMENS IN THE
 PAMLICO SOUND ESTUARY. CROAKERS WERE FED PRIMARILY ON POLYCHAETES AND
 COPEPODS, WHEREAS SPOT FED ON NEMATODES AND PLANT MATERIAL IN
 ADDITION TO POLYCHAETES AND COPEPODS. DIFFERENCES IN FOOD HABITS
 WERE RELATED TO FEEDING BEHAVIOR AND MORPHOLOGY OF THE GILL
 RAKERS.*

ROGERS, R. M.

NO. 80

1977. INTERRELATIONSHIPS OF SELECTED FISHES ON THE CONTINENTAL
SHELF OF THE NORTHERN GULF OF MEXICO
PHD DISSERTATION, TEXAS A&M UNIV 229PP

THE PRESENT STUDY SURVEYS THE TROPHIC INTERRELATIONSHIPS OF 26
DEMERAL FISHES INHABITING THE CONTINENTAL SHELF OF THE NORTHERN
GULF OF MEXICO. VOLUMETRIC STOMACH CONTENT ANALYSES WERE CARRIED
OUT ON 4,550 SPECIMENS. FISHES WERE COLLECTED AT 128 STATIONS
BETWEEN BROWNSVILLE, TEXAS AND ST. ANDREW'S BAY, FLORIDA IN DEPTHS
OF APPROXIMATELY 3 TO 200 METERS. WITHIN EACH SPECIES, FISH WERE
GROUPED BY SIZE, DEPTH, AND GEOGRAPHICAL LOCATION IN ORDER TO
COMPARE VARIATIONS IN FOOD HABITS DUE TO THESE FACTORS. FOOD
HABITS OF THE INDIVIDUAL SPECIES ARE DISCUSSED EMPHASIZING TRENDS
IN DIET BY FOOD CATEGORIES, TRANSITIONS ASSOCIATED WITH GROWTH,
AND VARIATIONS ASSOCIATED WITH GEOGRAPHICAL LOCATION. FEEDING
PERIODICITY IS DISCUSSED FOR THOSE SPECIES WHERE DATA WERE
AVAILABLE. FROM THIS DETAILED INFORMATION, TRENDS IN THE LIFE
HISTORY AND FOOD HABITS OF CONTINENTAL SHELF FISHES ARE PROPOSED.
LARGER INDIVIDUALS OF A SPECIES ARE INDICATED TO SPAWN IN DEEPER
WATERS. LARVAL AND JUVENILE FISHES SUBSEQUENTLY ENTER THE WATER
COLUMN, ESPECIALLY THE SUPRA-BENTHIC ZONE, WHERE THEY UNDERGO A
PLANKTONIC STAGE AS THEY ARE TRANSPORTED BY CURRENTS TOWARD
SHALLOWER WATERS. THEY EVENTUALLY SETTLE TO THE BOTTOM TO LEAD A
DEMERAL EXISTENCE. GRADUALLY MOVING OFFSHORE TO COMPLETE THE LIFE
CYCLE. THIS TREND IN LIFE HISTORY PATTERN IS REFLECTED IN THE
ONTOGENETIC FOOD HABIT TRANSITIONS. LARVAE AND JUVENILES FEED
LARGELY ON ZOOPLANKTON. THE IMPORTANCE OF ZOOPLANKTON DECREASES
WITH ONTOGENETIC DEVELOPMENT EXCEPT IN CERTAIN PLANKTIVOROUS
SPECIES. AS THE IMPORTANCE OF ZOOPLANKTON DECREASES, BENTHIC ORGAN
ORGANISMS INCREASE IN IMPORTANCE. SOME SPECIES REMAIN BENTHIC
FEEDERS THROUGHOUT THEIR LIFE CYCLE WHILE IN OTHERS, THE
CONTRIBUTION OF BOTTOM ANIMALS DECREASES, AND THEY ARE REPLACED
IN THE DIET BY LARGER MACROCRUSTACEANS AND MACROMOBILE ORGANISMS.
IN THESE HIGHER PREDATORS FEED IN THE WATER COLUMN ON ACTIVELY
SWIMMING PREY. *

ROSS, S. T. NO. 35
 1977. PATTERNS OF RESOURCE PARTITIONING IN SEAROBBINS,
 PISCES: TRIGLIDAE
 COPEIA 1977(3): 561-571

EIGHT SPECIES OF SEAROBBINS ARE COMMON ON THE WEST FLORIDA SHELF BETWEEN TAMPA & FORT MYERS. ALL HAVE THE SAME MOUTH SHAPE; THE PRINCIPAL DIFFERENCES BETWEEN SPECIES ARE RELATIVE MOUTH SIZE & ADULT BODY SIZE. CLUSTER ANALYSIS OF SEAROBBINS BASED ON PREY SIMILARITY INDICATED TWO PRINCIPAL SPECIES GROUPS CORRESPONDING, IN PART, TO INSHORE & OFFSHORE DISTRIBUTION PATTERNS. SEAROBBINS SHOWED TWO ADULT FEEDING MODES BASED ON PREY SIZE UTILIZATION. A "SCITULUS" MODE WAS SHOWN BY PRIONOTUS SCITULUS, BELLATOR MILITARIS, P. MARTIS & P. ROSEUS, IN WHICH AT LEAST 70% OF THE ADULT DIET WAS MADE UP OF PREY 10 MM OR SMALLER. A "TRIBULUS" MODE WAS SHOWN BY P. ALATUS, P. TRIBULUS, P. OPHRYAS & P. SALMONICOLOR, IN WHICH PREY LARGER THAN 10 MM MADE UP 66% OF THE ADULT DIET. "SCITULUS" MODE PREDATORS HAD SIGNIFICANTLY GREATER PERCENT RELATIVE ABUNDANCES THAN "TRIBULUS" MODE PREDATORS. THE DOMINANT METHOD OF RESOURCE PARTITIONING WAS MACROHABITAT PARTITIONING. AT HIGH LEVELS OF OVERLAP THERE WAS EVIDENCE OF PARTITIONING BY PREY SIZE.

ROSS, S.T. NO. 45
 1978. TROPHIC ONTOGENY OF THE LEOPARD SEAROBIN, PRIONOTUS SCITULUS
 (PISCES: TRIGLIDAE)
 FISH BULL 76(1): 225-235.

ONTOGENETIC FEEDING CHANGES OF THE LEOPARD SEAROBIN, PRIONOTUS SCITULUS, FROM TAMPA BAY, FLA., SHOWED A SHIFT FROM PLANKTONIC & EPIFAUNAL PREY IN SMALL FISH TO INFAUNAL PREY IN LARGER FISH. SMALLER FISH UTILIZED LARVAL CRUSTACEANS, NATANTIAN, BRACHYURANS, CUMACEANS, COPEPODS, & GAMMARID AMPHIPODS, WHILE LARGER FISH SHOWED INCREASING RELIANCE ON THE LANCELET, BRANCHIOSTOMA FLORIDAE. BIO MASS & LINEAR DIMENSIONS OF PREY INCREASED EXPONENTIALLY WITH FISH SIZE FOR LARGER FISH, BUT WERE RELATIVELY CONSTANT FOR SMALL FISH. RELATIVE PREY BIOMASS WAS LOWEST FOR INTERMEDIATE-SIZED P. SCITULUS (65-95 MM) & INCREASED FOR BOTH LARGE & SMALL PREDATORS SO THAT SMALL INDIVIDUALS WERE MOST SIMILAR TO VERY LARGE FISH IN TERMS OF RELATIVE PREY SIZE. THE SWITCH TO LARGER PREY WAS PRECEDED BY RAPID INCREASES IN MOUTH SIZE & INTESTINAL LENGTH, & WAS FOLLOWED BY ATTAINMENT OF MINIMUM REPRODUCTIVE SIZE & GREATER BODY WEIGHT PER UNIT LENGTH. SPATIAL & TROPHIC PARTITIONING APPEAR QUITE EFFICIENT IN REDUCING POTENTIAL INTRASPECIFIC COMPETITION.

ROUSSEL, J.E. AND R.H. KILGEN
1975. NO. 44
FOOD HABITS OF YOUNG ATLANTIC CROAKERS (MICROPOGON UNDULATUS) IN
BRACKISH PIPELINE CANALS
LOUISIANA ACAD SCI 38: 70-74.
STOMACH CONTENTS OF 50 YOUNG ATLANTIC CROAKERS TRAPPED IN CLOSED-
OFF BRACKISH-WATER PIPELINE CANALS IN LAFOURCHE PARISH, LOUISIANA
INDICATED THAT THEIR DIET CONSISTED OF DETRITUS, MYSID SHRIMP, IN
SECTS, OSTRACODS & COPEPODS, FISHES & CRABS, AMPHIPODS & ISOPODS,
ANNELIDS & MOLLUSCS.

SCHWARTZ, F. J. ET AL 83
 1980. ANALYSES OF SELECTED FISHES CAPTURED IN CAPE FEAR ESTUARY
 AND ADJACENT ATLANTIC OCEAN, NORTH CAROLINA, 1973-1978
 INST MAR SCI UNIV NC 254PP

EXTENSIVE ANALYSES OF STOMACH CONTENTS FOR 11 COMMON FISHES IN
 THE CAPE FEAR ESTUARY AND ADJACENT OFFSHORE WATERS WERE CONDUCTED
 DURING 1973-1978. SPECIES STUDIED WERE SPOT (LEIOSTOMUS XANTHURUS)
 ATLANTIC CROAKER (MICROPOGONIAS UNDULATUS), SOUTHERN KINGFISH
 (Menticirrhus americanus), SILVER PERCH (Bairdiella chrysoura),
 GREY TROUT (Cynoscion regalis), BANDED DRUM (Lagodon rhomboides),
 SPOTTED DRUM (Stellifer lanceolatus), PINFISH (Lagodon rhomboides),
 SPOTTED HAKE (Urophycis regia), SUMMER FLOUNDER (Paralichthys
 dentatus), AND BAY ANCHOVY (Anchoa mitchelli). THESE SPECIES WERE
 FOUND TO PARTITION THE AVAILABLE HABITAT & FOOD RESOURCES AS A
 RESULT OF THEIR DIFFERENT MORPHOLOGIES, BEHAVIORS, SWIMMING
 CAPABILITIES, & SEASONAL OCCURRENCES WITHIN THE CAPE FEAR SYSTEM.

SEDBERRY, G. R. AND J. A. MUSICK

1978. FEEDING STRATEGIES OF SOME DEMERSAL FISHES OF THE CONTINENTAL SLOPE AND RISE OFF THE MID-ATLANTIC COAST OF THE USA. MAR BIOL 44: 357-375.

STOMACH CONTENTS OF 729 FISHES COMPRISING 16 SPECIES WERE EXAMINED FROM THE CONTINENTAL SLOPE & RISE OFF THE MIDDLE ATLANTIC STATES OF THE USA. TWO MAIN FEEDING MODES AMONG DEMERSAL DEEP-SEA FISHES WERE EVIDENT: THOSE FEEDING PRIMARILY ON PELAGIC DEEP-SEA FISHES & THOSE FEEDING ON BENTHIC INVERTEBRATES. BOTH PELAGIC & BENTHIC PREDATORS WERE EURYPHAGOUS. MOST PELAGIC PREDATORS ALSO FED ON THE EPIBENTHOS. THESE FINDINGS SUPPORT DAYTON & HESSLER'S (1972) SUGGESTION THAT BENTHIC PREDATORS SHOULD HAVE A GENERALIZED DIET WHICH MAY BE RESPONSIBLE FOR THE HIGH DIVERSITY FOUND IN THE DEEP-SEA INFAUNA. THE MESOPELAGIC FAUNA IS AN IMPORTANT FOOD SOURCE FOR SOME DEMERSAL FISHES ON THE CONTINENTAL SLOPE. PELAGIC PREY, WHICH ARE ALSO IMPORTANT TO ECOLOGICALLY DOMINANT DEMERSAL FISHES, ON THE LOWER SLOPE & CONTINENTAL RISE, MAY BE NUTRITIONALLY SUPPORTED BY SUSPENDED PARTICULATE ORGANIC MATTER IN A NEPHELOID LAYER CLOSE TO THE BOTTOM, & THEY MAY EXIST IN MUCH HIGHER CONCENTRATIONS THAN IN THE BATHYPELAGIC ZONE ABOVE.

SEDBERRY, G.R. AND MUSICK, J.A.
 1979. NO. 79
 COMMUNITY STRUCTURE: ANALYSIS AND FOOD HABITS OF FISHES, SECT. I:
 FOOD HABITS OF FISHES. VA INST MAR SCI
 MID-ATLANTIC OUTER CONT SHELF ENVIR STUD 2-C:CHPT 9, 133PP

FOOD HABITS OF CONTINENTAL SHELF FISHES WERE EXAMINED. DOMINANT
 FISHES WERE LITTLE SKATE, RAJA ERINACEA, GOOSEFISH, LOPHIUS
 AMERICANUS, RED HAKE, UROPHYCIS CHUSS, SPOTTED HAKE, U. REGIS, SILVER
 HAKE, MERLUCCIIUS BILINEARIS, OCEAN POUT, MACROZOARCES AMERICANUS,
 SCUP, STENOTOMUS CHRYSOPS, GULF STREAM FLOUNDER, CITHARICHTHYS
 ARCTIFRONS, AND FOURSPOT FLOUNDER, HIPPOGLOSSINA OBLONGA. BENTHIC
 MACROINVERTEBRATES WERE THE PRIMARY FOOD OF THESE DEMERSAL FISHES.
 DIETARY OVERLAP AMONG THE PREDATORS VARIED SEASONALLY.*

SEKAVEC, G. B. NO. 5
 1974. SUMMER FOODS, LENGTH-WEIGHT RELATIONSHIP, AND CONDITION FACTOR OF
 JUVENILE LADYFISH, ELOPS SAURUS, FROM LA. COASTAL STREAMS
 TRANS AM FISH SOC 103(3): 472-476.

A TOTAL OF 295 JUVENILE LADYFISH ELOPS SAURUS LINNAEUS WERE COL-
 LECTED WITH SURFACE TRAWLS FROM LOUISIANA COASTAL STREAMS IN JUNE
 1968 & JUNE 1969. THE FISH RANGED FROM 45 TO 201 MM IN FORK CON-
 LENGTH. OF THE 295 LADYFISH STOMACHS EXAMINED, 229 (77.6%) CON-
 TAINED FOOD. FISH CONSTITUTED 94.5% BY OCCURRENCE OF THE FOOD
 ORGANISMS & DECAPOD CRUSTACEANS 5.5%. GULF MENHADEN COMPRISED
 72.0% OF THE FISH IDENTIFIED. THE CALCULATED LENGTH-WEIGHT RELA-
 TIONSHIP FOR JUVENILE LADYFISH IN THE SIZE RANGE 45-201 MM (FORK
 LENGTH) WAS $\text{LOG}_{10} W = -5.3295 + 3.1123 \text{ LOG}_{10} L$, & THE MEAN CONDITION
 COEFFICIENT WAS 8.1.

SHERIDAN, P.F. NO. 69
1978. HABITS OF THE BAY ANCHOVY, ANCHOA MITCHILLI, IN APALACHICOLA
BAY, FLORIDA
NE GULF SCI 2(2): 126-132.

ONTOGENETIC, SPATIAL & TEMPORAL ASPECTS OF THE FOOD HABITS OF THE
BAY ANCHOVY, ANCHOA MITCHILLI, WERE EXAMINED IN FISH COLLECTED
FROM APALACHICOLA BAY, FLORIDA. CALANOID COPEPODS WERE THE MAJOR
CONSTITUENT OF THE ANCHOVY DIET, BUT THEIR IMPORTANCE DECLINED
WITH FISH GROWTH AS LARGER ZOOPLANKTERS SUCH AS MYSIDS WERE
CONSUMED. SPECIALIZATION UPON COPEPODS LED TO MODERATE DIETS
SIMILARITY AMONG SITES IN THE ESTUARY, EXCEPT IN AREAS NEAR THE
MOUTH OF THE APALACHICOLA RIVER WHERE MYSIDS, INSECT LARVAE, &
CLADOCERANS WERE MAJOR FOOD ITEMS. COPEPODS WERE THE DOMINANT
PREY IN ALL MONTHS BUT WERE MARKEDLY LESS ABUNDANT PREY IN
OCTOBER, DECEMBER, & FEBRUARY WHEN OTHER CRUSTACEANS & INSECT
LARVAE BECAME RELATIVELY MORE ABUNDANT.

SHERIDAN, P. F. NO. 12
 TROPHIC RESOURCE UTILIZATION BY THREE SPECIES OF SCIAENID FISHES
 IN A NORTHWEST FLORIDA ESTUARY
 THE GULF SCI 3(1): 1-15.

FOOD HABITS OF ATLANTIC CROAKER MICROPOGONIAS UNDULATUS), SPOT (CLEISTOMUS XANTHURUS), & SAND SEATROUT (CYNOScion ARENARIUS) WERE EXAMINED IN 1976 COLLECTIONS FROM APALACHICOLA BAY, FLORIDA. ONTOGENETIC, SPATIAL, & TEMPORAL ASPECTS OF DIET WERE CONSIDERED. POLYCHAETES WERE MAIN FOOD OF CROAKERS OVER ALL COLLECTIONS, FOLLOWED IN IMPORTANCE BY DETRITUS, FISHES, INSECT LARVAE, MYSIDS, & INFUNAL SHRIMP. DIET SPECIALIZATION OCCURRED WITH GROWTH OF CROAKERS, SO THAT ONE OR TWO FOOD TYPES DOMINATED THE DIET. INTRASPECIFIC DIET CORRELATION USING THE SPEARMAN RANK CORRELATION COEFFICIENT, INDICATED THREE FEEDING GROUPS: 10-39 MM FISH, 40-89 MM FISH AND 90-159 MM FISH. CROAKER FEEDING IN SHALLOW, LOW DEEPER, MORE SALINE AREAS. TEMPORAL ANALYSIS (JANUARY-SEPTEMBER) OF THE CROAKER DIET REFLECTED FOUR FEEDING PATTERNS: (1) FIRST ENTRY INTO THE ESTUARY BY SMALL SIZE CLASSES; (2) AREA-WIDE DISTRIBUTION OF MANY SIZE CLASSES; (3) CONCENTRATION OF MID-SIZE INDIVIDUALS IN THE UPPER ESTUARINE AREAS, & (4) EMIGRATION OF LARGE SIZE SPOT POLYCHAETES & HARPACTICOID COPEPODS DOMINATED THE AVERAGE SPOT DIET, FOLLOWED BY DETRITUS, BIVALVES & NEMATODES. SEVERAL DISTINCTIVE PATTERNS IN FEEDING WERE NOTED ON ONTOGENETIC & SPATIAL BASES BUT NOT ON A TEMPORAL BASIS. INTRASPECIFIC DIET CORRELATION (20-29 MM) & LARGEST (100-109 MM) SIZE CLASSES EXAMINED. JUVENILE FISHES (MAINLY ANCHOA MITCHILLI) DOMINATED THE SAND SEATROUT DIET, WHILE MYSIDS RANKED A DISTINCT SEATROUT FEEDING (ALSO INDICATED BY INTRA GENETIC CORRELATION), WHEREIN SMALLER SIZE CLASSES PREYED HEAVILY ON MYSIDS FOLLOWED BY A SWITCH TO PISCIVORY BY LARGER INDIVIDUALS. SPATIAL ANALYSIS INDICATED HEAVY CONSUMPTION OF FISHES BY SAND SEATROUT NEAR HIGH SALINITY PASSES TO THE ESTUARY, GRADING INTO HEAVY CONSUMPTION OF MYSIDS IN SHALLOW, LOW SALINITY AREAS. TEMPORAL ANALYSIS (MAY-NOVEMBER) REVEALED RELATIVELY LOWER PRE DATION ON FISHES IN LATE SUMMER WHEN VARIOUS CRUSTACEANS WERE IMPORTANT DIET COMPONENTS.

SHERIDAN, P.F. AND R.J. LIVINGSTON
 1979. NO. 11
 CYCLIC TROPHIC RELATIONSHIPS OF FISHES IN AN UNPOLLUTED
 RIVER-DOMINATED ESTUARY IN NORTH FLORIDA
 LIVINGSTON(ED) ECOL PROCES COAST MAR SYST, PLENUM PRESS, NY:143-161

REGULAR PATTERNS IN SEASONAL OCCURRENCE OF DOMINANT FISHES WERE
 OBSERVED OVER A SIX-YEAR PERIOD IN THE APALACHICOLA ESTUARY OF
 NORTH FLORIDA. EXAMINATION OF POTENTIAL PHYSICO-CHEMICAL & BIOLOG
 ICAL COMMUNITY DETERMINANTS HAS LED TO THE HYPOTHESIS THAT TROPHIC
 RELATIONSHIPS & UNDERLYING PHYSICAL-BIOLOGICAL INTERACTIONS STRUC
 TURE THIS ESTUARINE FISH COMMUNITY. SIX SPECIES (ANCHOA MITCHELLI,
 MICROPOGONIAS UNDULATUS, LEIOSTOMUS XANTHUS, CYNOScion ARENARIUS,
 BREVOORTIA PATRONUS, & BAIRDIELLA CHRYSURA) COMPRISE 85% OF THE
 TRAWL-SUSCEPTIBLE FISHES IN THE APALACHICOLA SYSTEM, & EACH IS
 CHARACTERIZED BY DISTINCTIVE SEASONAL ABUNDANCES & TROPHIC SPEC
 TRA. TWO BENTHIC OMNIVORES (MICROPOGONIAS & LEIOSTOMUS) EXHIBIT
 HIGH SPATIAL & TEMPORAL OVERLAP BUT DIFFER IN PREY TYPE & SIZE.
 THESE TWO SPECIES UTILIZE THE ESTUARY SUBSEQUENT TO HIGH RIVER
 DISCHARGE/DETRITUS INPUT & CONCURRENT WITH MAXIMUM BENTHIC
 STANDING CROPS. TWO EPIBENTHIC CARNIVORES (CYNOScion & BAIRDIELLA)
 ALSO USE THE ESTUARY BUT DIFFER IN TIMES OF PEAK ABUNDANCES & IN
 PREY TYPES. TWO PLANKTIVORES (BREVOORTIA & ANCHOA) ALSO FREQUENT
 THE ESTUARY BUT DURING COOCCURS WITH THE MAXIMUM ZOOPLANKTON
 TIVELY), YET NEITHER COOCCURS WITH THE MAXIMUM ZOOPLANKTON SO BY THE
 STANDING CROP (SUMMER). ANCHOA IS PREVENTED FROM DOING SO BY THE
 PISCIVOROUS CYNOScion POPULATION. THUS, REGULAR SEASONAL PROGRES
 SIONS OF DOMINANT FISHES ARE LINKED TO AVAILABLE TROPHIC RESOURCES
 COMPETITION, & PREDATION,

SHIPP, R. L.

NO. 10

SUMMARY OF KNOWLEDGE OF FORAGE FISH SPECIES OF MOBILE BAY AND
VICINITY
LOYACAND & SMITH(EDS) SYMP NAT RES MOBILE BAY EST, 167-176

FORAGE FISH SPECIES OF MOBILE BAY ARE ASSIGNED TO ONE OF THREE
ECOLOGICAL CATEGORIES: 1) NEARSHORE/MARSH, 2) DEMERSAL ESTUARINE,
& 3) PELAGIC ESTUARINE. DOMINANT SPECIES OF THE NEARSHORE/MARSH
HABITAT ARE LIVEBEARERS(POECILIIDAE), KILLIFISHES(CYPRINODONTIDAE)
& SILVERSIDES (ATHERINIDAE). THE FORMER TWO FAMILIES CONTAIN
HEARTY SPECIES, RESISTANT TO CONTAMINANTS, WHILE THE LATTER FAMILY
INCLUDES SPECIES, EXHIBITING LITTLE RESISTANCE. THE DEMERSAL
ESTUARINE SPECIES ARE DOMINATED BY DRUMS (SCIAENIDAE), & LIFE
HISTORY DATA ARE AVAILABLE, BUT TOLERANCES TO CONTAMINANTS ARE NOT
WELL DOCUMENTED IN THE LITERATURE. THE MOST IMPORTANT FORAGE GROUP
IS THE PELAGIC ESTUARINE, DOMINATED BY ANCHOVIES (ENGRaulidae) &
HERRINGS (CLUPEIDAE). RECENT STUDIES CITING THE PLACE IN THE FOOD
CHAIN & DIETARY PREFERENCES FOR THE BAY ANCHOVY ANCHOA MICHILLI
DEMONSTRATE ITS DEPENDENCE ON COMPONENTS OF ZOOPLANKTON. RELATIVE
ABUNDANCE TABLES INDICATE THAT WHERE COMPARATIVE DATA ARE AVAIL
ABLE, MOST NORTHERN GULF OF MEXICO ESTUARIES SUPPORT A SIMILAR
FORAGE FISH FAUNAS. INFORMATION ON EARLY LIFE HISTORY IS RECOG
NIZED AS THE MOST CRITICAL NEED FOR THIS GROUP OF FISHES, WHILE
INFORMATION ON SPECIES COMPOSITION, SEASONALITY, & OCCURRENCE
FREQUENCY APPEARS ADEQUATE. HOWEVER, INDICATIONS OF STRESS ON THE
BAY ENVIRONMENT MAY BE RECOGNIZED BY CHANGES IN THESE PARAMETERS.

SIKORA, W.B., R.W. HEARD AND M.D. DAHLBERG
1972. NO. 9
THE OCCURRENCE AND FOOD HABITS OF TWO SPECIES OF
HAKE, UROPHYCIS REGIUS AND U. FLORIDANUS IN GEORGIA ESTUARIES
TRANS AM FISH SOC 101(3): 513-525.

FROM 1967 TO 1970 A TOTAL OF 2,683 SPOTTED HAKE, UROPHYCIS REGIUS
& 470 SOUTHERN HAKE, U. FLORIDANUS WERE COLLECTED & FOUND TO
EXHIBIT MIGRATORY PATTERNS IN GEORGIA SIMILAR TO NORTHERN & GULF
POPULATIONS OF THESE FISH. THE FOOD HABITS OF INSHORE JUVENILE
POPULATIONS OF THESE TWO SPECIES OF HAKE COLLECTED FROM COASTAL
SALT MARSH-ESTUARINE AREAS NEAR SAPELO ISLAND, GEORGIA WERE
EXAMINED. THE 341 SPOTTED HAKE & 192 SOUTHERN HAKE EXAMINED CON-
TAINED IDENTIFIABLE FOOD ITEMS. THESE WERE ANALYZED FOR THE NUMBER
OF INDIVIDUAL FOOD ORGANISMS, PERCENT FREQUENCY OF OCCURRENCE, &
PERCENT BIOMASS. THE MOST IMPORTANT GROUP IN OCCURRENCE & BIOMASS
WAS THE CRUSTACEA WITH MACRURA & NATANTIA MOST IMPORTANT GRAVIME-
TRICALLY, AMPHIPODA & MYSIDACEA MOST FREQUENTLY OCCURRING. THESE
DATA WHEN COMBINED WITH THE HABITS OF THE FOOD ORGANISMS ESTAB-
LISHED THESE TWO HAKES AS SPECIES WHICH USE THE ESTUARY AS
"NURSERY GROUNDS."

STICKNEY, R.R. NO. 8
 1976. FOOD HABITS OF GEORGIA ESTUARINE FISHES II.
 SYMPHURUS PLAGIUSA (PLEURONECTIFORMES: CYNOGLOSSIDAE)
 TRANS AM FISH SOC 105(2): 202-207

EXAMINATION OF THE DIGESTIVE TRACTS OF 588 BLACKCHEEK TONGUEFISH,
 SYMPHURUS PLAGIUSA, DURING 1973 & 1974 INDICATED A PRIMARILY
 BENTHIC FEEDING HABIT. MOLLUSKS & VARIOUS CRUSTACEANS WERE THE
 MOST COMMON IDENTIFIABLE CONSTITUENTS OF THE DIET DURING ALL TIMES
 OF THE YEAR IN FISH OF ALL SIZES ABOVE POSTLARVAE IN BOTH RIVERS &
 SOUNDS IN GEORGIA ESTUARIES. SAND GRAINS WERE PRESENT IN ABOUT
 HALF OF THE FISH.

STICKNEY, R.R., G.L. TAYLOR AND R.W. HEARD

1974. NO. 42

FOOD HABITS OF GEORGIA ESTUARINE FISHES I. FOUR SPECIES OF

FLOUNDERS. (PLEURONECTIFORMES; BOTHIDAE)

FISH BULL 72(2): 515-525.

THE FOOD HABITS OF FOUR SPECIES OF BOTHID FLOUNDERS FROM GEORGIA COASTAL WATERS WERE EXAMINED BY MEANS OF STOMACH CONTENT ANALYSES. OCELLATED FLOUNDERS, ANCYLOPSETTA QUADROCELLATA (GILL); BAY WHIFF, CITHARICHTHYS SPILOPTERUS (GUNTHER); & WINDOWPANE, SCOPHTHALMUS AQUOSUS (MITCHILL) FED HEAVILY ON THE MYSID SHRIMP, NEOMYSIS AMERICANA, WITHOUT REGARD TO SEASON OF THE YEAR OR LOCATION WITHIN THE ESTUARY. THE FOOD HABITS OF BOTH A. QUADROCELLATA & C. SPILOPTERUS CHANGED TO SOME EXTENT AS THE FISH BECAME LARGER. ORGANISMS LARGER THAN N. AMERICANA DOMINATED THE STOMACH CONTENTS OF A QUADROCELLATA LARGER THAN 150 MM STANDARD LENGTH & C. SPILOPTERUS LARGER THAN 125 MM. S. AQUOSUS, IN THE SIZE RANGE EXAMINED, WAS MOST EXCLUSIVELY ON N. AMERICANA. FRINGED FLOUNDER, ETROPLUS CROSOTUS (JORDAN & GILBERT) PRIMARILY CONSUMED THE CALANOID COPEPOD, PSEUDODIAPTOMUS CORONATUS, DURING THE SPRING, SUMMER, & FALL AND DIVERSIFIED THEIR FOOD HABITS DURING THE WINTER. P. CORONATUS DOMINATED THE STOMACH CONTENTS BOTH IN THE RIVERS & SOUNDS OF GEORGIA ESTUARINE WATERS & WAS THE DOMINANT ORGANISM IN FISHES OF ALL SIZES UP TO 100 MM WHEN POLYCHAETE ANNELIDS BECAME IMPORTANT. THE FOOD OF E. CROSOTUS DID NOT APPEAR TO VARY WITH TIME OF DAY; HOWEVER, E. CROSOTUS DID NOT ACTIVELY FEED AT NIGHT. THE DIFFERENCE IN FOOD HABITS BETWEEN E. CROSOTUS & THE OTHER THREE BOTHID SPECIES APPEARS TO BE ASSOCIATED WITH THE RELATIVE SIZE OF THE MOUTH.

STICKNEY, R.R., G.L. TAYLOR AND D.B. WHITE
1973. HABITS OF FIVE SPECIES OF YOUNG SOUTHEASTERN UNITED STATES
ESTUARINE SCIAENIDAE
CHESAPEAKE SCI 16(2): 104-114

THE FOOD HABITS OF FIVE SPECIES OF THE FAMILY SCIAENIDAE, BAIRDIELLA CHRYSURA, CYNOSCIION REGALIS, LEIDOSTOMUS XANTHURUS, MICROPOGON UNDULATUS, & STELLIFER LANCEOLATUS, WERE EXAMINED IN SPECIMENS OF LESS THAN 200 MM STANDARD LENGTH, COLLECTED IN ESTUARIES BETWEEN GEORGETOWN, SOUTH CAROLINA, & JACKSONVILLE, FL. B. CHRYSURA, M. UNDULATUS & S. LANCEOLATUS DID NOT FEED HEAVILY ON HIGHLY SELECTIVE IN THEIR FOOD HABITS; C. REGALIS & L. XANTHURUS THE MYSID SHRIMP, NEOMYSIS AMERICANA, & ON FISH; & L. XANTHURUS WAS SELECTIVE TOWARD HARPACTICOID & CALANOID COPEPODS. HOWEVER, IN HABITS OF THE FIVE SPECIES OF FISH EXAMINED WERE RELATIVELY CONSTANT WITH SEASON & LOCATION WITHIN THE ESTUARY; HOWEVER, IN GENERAL, LARGER FOOD ORGANISMS WERE CONSUMED AS THE SCIAENIDS INCREASED IN SIZE. THE EXCEPTION WAS L. XANTHURUS WHICH MAINTAINED THE SAME FOOD HABITS AT ALL SIZES EXAMINED.

STONER, A.W. NO. 3
 1980. FEEDING ECOLOGY OF LAGODON RHOMBOIDES (PISCES: SPARIDAE):
 VARIATION AND FUNCTIONAL RESPONSES
 FISH BULL 78(2): 337-351.

FIVE MAJOR ONTOGENETIC STAGES WERE FOUND IN THE DIET OF PINFISH, LAGODON RHOMBOIDES, FROM APALACHEE BAY, FLORIDA, BUT DIET & LAGODON RHOMBOIDES SHOWED HIGH DEGREES OF VARIATION WITH SPACE (BOTH DIETARY BREADTH SHOWED SEASONAL VARIATION WITHIN SIZE CLASSES WAS LOCAL & GEOGRAPHIC), ONTOGENETIC VARIATION. LAGODON RHOMBOIDES OFTEN AS DRAMATIC AS SEASONAL VARIATION. LAGODON RHOMBOIDES DEMONSTRATED PLANKTIVORY, STRICT CARNIVORY, & STAGES. HERBIVORY AT DIFFERENT TIMES, PLACES, & DEVELOPMENTAL STAGES. ONTOGENETIC PATTERN IN FOOD HABIT OF THE PREDATOR. UNTIL IT REACHES MOUTH SIZE & CHANGING, THE PINFISH IS AN OBLIGATE CARNIVORE. 35 MM STANDARD LENGTH, VARIATION IN THE FOOD HABITS OF PINFISH WAS A SPATIAL & TEMPORAL VARIATION IN THE FOOD ABUNDANCES OF FOOD ITEMS IN THE FIELD. CHANGES IN PLANT & CONSUMPTION BY FISH LARGER THAN 35 MM STANDARD LENGTH MAY BE DUE TO CHANGING PLANT ABUNDANCE OR PROTECTION OF PREY SPECIES BY THE FUNCTIONAL ROLE OF A SINGLE PREDATOR. SINCE SEAGRASS BIOMASS & TIME, PLANT-ANIMAL LIFE HISTORY OF L. RHOMBOIDES IS WELL ADAPTED TO SEASONAL VARIATION IN DIETS RENDERED THE FOODPHIC ORGANISMS. MULTIDIMENSIONAL. IT IS CONCLUDED THAT FOOD WEBS ARE NOT BE FUNCTIONAL COMPONENTS IN SPACE & THAT TAXONOMIC PATHWAYS & PREDATOR-PREY RELATIONSHIPS.

TARGETT, T. T. NO. 40
 1978. RESOURCE PARTITIONING BY THE PUFFERFISHES SPHEROIDES
 SPENGLERI AND S. TESTUDINEUS FROM BISCAYNE BAY, FLORIDA
 MAR BIOL 49: 83-91

PARTITIONING OF THE FOOD RESOURCES BY TWO COEXISTING PUFFERFISHES
 (SPHEROIDES SPENGLERI & S. TESTUDINEUS) FROM BISCAYNE BAY, FL.,
 USA, WAS INVESTIGATED. GUT CONTENTS FROM 453 BANDTAIL & 339
 CHECKERED PUFFERS WERE ANALYZED. THE DIETS OF BOTH SPECIES CON
 SISTED OF A VARIETY OF DENTHIC PREY, BUT ONLY CRUSTACEANS &
 MOLLUSCS WERE IMPORTANT PREY GROUPS. WHILE DIFFERENCES WERE FOUND
 IN THE PROPORTIONS OF GENERAL PREY CATEGORIES EATEN BY THESE
 FISHES, BOTH SPECIES CONSUMED SUBSTANTIAL QUANTITIES OF BRACHYURAN
 CRABS, BIVALVES, & GASTROPODS. SPECIFIC IDENTIFICATION OF THE PREY
 ITEMS WITHIN THESE THREE FOOD CATEGORIES REVEALED ADDITIONAL
 DIFFERENCES IN PREY BETWEEN THE TWO PUFFER SPECIES. THIS PARTI
 TIONING OF THE FOOD RESOURCES BY BANDTAIL & CHECKERED PUFFERS WAS
 FOUND BETWEEN BOTH SPECIES OVERALL, BETWEEN OVERLAPPING SIZE
 RANGES, & BETWEEN BOTH SPECIES. MOST ABUNDANT SIZE GROUP. DIFF
 ERENCES IN FOOD HABITS BETWEEN THESE TWO FISHES ILLUSTRATE THAT
 CONGENERS WITH VIRTUALLY IDENTICAL MOUTH STRUCTURE & COMPLETE
 SPATIAL OVERLAP CAN SIGNIFICANTLY PARTITION THE FOOD RESOURCES.

IVER, G.W., S.M. ADAMS AND M.W. LACROIX

NO. 39

STRUCTURAL AND FUNCTIONAL ASPECTS OF A RECENTLY ESTABLISHED

MEIOFAUNA MARINA COMMUNITY.

FROMIN, L.E. (ED) ESTUARINE RES, ACADEMIC PRESS 1:518-541

ALTHOUGH THE VALUE OF EEL-GRASS PRODUCTIVITY TO AN ECOSYSTEM HAS BEEN RECOGNIZED FOR OVER 50 YEARS, LITTLE QUANTITATIVE INFORMATION IS AVAILABLE ON ANY MAJOR PORTION OF THE EEL-GRASS COMMUNITY IN NORTH AMERICA, SAVE FOR ON THE GRASS ITSELF. THE EPIFAUNAL & INFAUNAL INVERTEBRATES & THE FISHES INHABITING A GRASS BED IN THE NEWPORT RIVER ESTUARY ARE DOMINATED BY ONLY A FEW SPECIES. THE DENSITY & BIOMASS OF THESE GROUPS ARE CONSIDERABLY GREATER THAN IN THE ADJACENT UNVEGETATED PORTIONS OF THE ESTUARY. FISHES USING THE GRASS BED APPEARED TO EXACT SOME CONTROL OVER THE DENSITY OF THE EPIFAUNAL COMMUNITY. THE MACROFAUNA IN THE BED CONSUME AN AMOUNT OF ENERGY EQUIVALENT TO 55% OF THE NET PRODUCTION OF EEL-GRASS, PHYTOPLANKTON, & BENTHIC ALGAE IN THE BED. THERE IS SUFFICIENT AVAILABLE ENERGY TO SUPPORT THE ESTIMATED BACTERIA-MICROFAUNA-MEIOFAUNA COMPARTMENT. THE DATA FURTHER SUGGEST THAT THERE IS AN EXCESS OF PLANT PRODUCTION IN THE BED, A PORTION OF WHICH IS INCREASING THE ORGANIC CONTENT OF THE SEDIMENTS. THE REMAINDER IS PROBABLY EXPORTED TO THE ADJOINING ESTUARY. THIS EXPORT MAY BE HIGHLY SIGNIFICANT TO THE TROPHIC FUNCTION OF THE SHALLOW ESTUARINE SYSTEM NEAR BEAUFORT, SINCE EEL-GRASS IS ESTIMATED TO SUPPLY AS MUCH AS 64% OF THE TOTAL PRODUCTION OF PHYTOPLANKTON, CORD GRASS & EEL-GRASS IN THIS SYSTEM.

TOOLE, J.E. NO. 4
 1971. STUDY OF THE BOWFIN AND GARS IN EASTERN TEXAS
 FOOD SERIES, TEXAS PARKS AND WILDLIFE DEPT., MARSHALL, TX 6:1-14
 DURING THE FIVE YEAR PERIOD OF THIS STUDY, 1,514 GAR & BOWFIN
 STOMACHS WERE COLLECTED & EXAMINED. SPOTTED GAR (LEPISOSTEUS
 OCCIDENTALIS), ALLIGATOR GAR (L. SPATULAS), LONGNOSE GAR (L. OSSEUS) &
 BOWFIN (AMIA CALVA) WERE EVALUATED AS PREDATOR SPECIES FOR THE
 WATERS OF EAST TEXAS. INSUFFICIENT DATA WERE AVAILABLE TO DETERMINE ITS VALUE AS A PREDATOR &
 PREDATOR OF GAR. SPECIFIC ANALYSIS INDICATES THE ALLIGATOR &
 SPOTTED GAR ARE THE MORE SPECIFIC PREDATORS THAN THE
 LONGNOSE GAR. ALL OF THE FISH IN GIVEN WATERS CAN BE
 ATTRIBUTED TO NON-SELECTIVE FEEDING HABITS DEPENDENT ONLY ON FOOD
 AVAILABILITY.

VIRNSTEIN, R. W. NO. 52
 THE IMPORTANCE OF PREDATION BY CRABS AND FISHES ON BENTHIC INFAUNA
 IN CHESAPEAKE BAY
 ECOLOGY 50: 1199-1217

THE SIGNIFICANCE OF LARGE MOTILE PREDATORS IN CONTROLLING THE DISTRIBUTION & ABUNDANCE OF THE MACROBENTHIC INVERTEBRATES WITHIN THE SUBTIDAL SAND COMMUNITY WAS TESTED USING FIELD EXPERIMENTS. THE BLUE CRAB (*CALLINectes sapidus*) & 2 SPECIES OF BOTTOM-FEEDING FISHES, SPOT (*Leiostomus xanthurus*) & NOBCHUCK (*Trinectes maculatus*), WERE CONFINED TO SMALL AREAS USING WIRE MESH ENCLOSURES. THE INFAUNA RESPONDED TO DECREASED PREDATION WITH A LARGE INCREASE IN DENSITY & DIVERSITY WITHIN 2 TO 4 WEEKS. SPECIES WHOSE POPULATIONS WERE LEAST AFFECTED BY PREDATION WERE THOSE SPECIES WHOSE SPECIES EITHER LIVE DEEP IN OR QUICKLY BURROW INTO THE SEDIMENT. THESE SPECIES IN THE NATURAL COMMUNITY, FOR WHICH GROWTH WAS VERY RAPID, INDIVIDUALS GROWING TO MATURITY IN ONLY A FEW MONTHS. DENSITIES OF ALL INFAUNAL SPECIES INCREASED IN ENCLOSURES, SUGGESTING THAT THEIR POPULATION DENSITIES UNDER NATURAL CONDITIONS ARE NOT CONTROLLED BY COMPETITIVE INTERACTIONS. IN THIS COMMUNITY, INFAUNAL POPULATION SIZES ARE LIMITED BY PREDATION & NOT BY FOOD OR SPACE. SEVERE PREDATION PRESSURE & PHYSICAL DISTURBANCES, PARTICULARLY SEDIMENT INSTABILITY, KEEP POPULATION LEVELS FAR BELOW THE CARRYING CAPACITY OF THE ENVIRONMENT. SEVERE PREDATION, & THE RAPID GROWTH, SHORT GENERATION TIMES, & RAPID TURNOVER RATES OF CONSTITUENT POPULATIONS SUGGEST THAT SUCH INFAUNAL COMMUNITIES, DESPITE A LOW STANDING CROP, ARE AN IMPORTANT FOOD SOURCE FOR PREDATOR SPECIES IMPORTANT TO MAN.

VIRNSTEIN, R. W. NO. 63
 1978. PREDATOR CAGING EXPERIMENTS IN SOFT SEDIMENTS: CAUTION ADVISED
 WILEY, M. L. (ED) ESTUARINE INTERACTIONS ACADEMIC PRESS, INC.: 261-273

FIELD EXPERIMENTS IN WHICH PREDATORS WERE EXCLUDED FROM SOFT-SEDI-
 MENT COMMUNITIES HAVE BEEN DONE IN THE YORK RIVER, VIRGINIA, THE
 INDIAN RIVER, FLORIDA, & THE SHALLOW CONTINENTAL SHELF OFF SOUTH
 EAST FLORIDA. THE YORK RIVER EXPERIMENT REVEALED THAT PREDATORS
 ON INFAUNAL MACROBENTHOS ARE IMPORTANT IN DETERMINING COMMUNITY
 STRUCTURE & POPULATION DENSITIES. THERE APPEARED TO BE ONLY TWO
 MAJOR PREDATORS IN SHALLOW WATER - THE BLUE CRAB CALLINectes
 SAPIDUS (CRUSTACEA: PORTUNIDAE) & THE SPOT LEIOSTOMUS XANTHURUS
 (PISCES: SCIAENIDAE). THE SAME EXPERIMENTS IN THE INDIAN RIVER, A
 COASTAL LAGOON, SHOWED NO DIFFERENCES BETWEEN RESULTS INSIDE
 & OUTSIDE EXCLOSURES. THE DIFFERENCES BETWEEN RESULTS IN THE TWO
 GEOGRAPHIC AREAS ARE ATTRIBUTED TO THE GREATER ABUNDANCE IN THE
 INDIAN RIVER OF SMALL DECAPOD PREDATORS WHICH WERE NOT EXCLUDED BY
 THE EXCLOSURES. THESE DECAPOD PREDATORS ACTUALLY INCREASED IN ABUNDANCE
 IN EXCLOSURES. PRELIMINARY RESULTS FROM EXPERIMENTS ON THE SHALLOW
 SANDY SHELF INDICATE THAT THE MACROFAUNA, ONE MUST NOT ASSUME THE
 HERE ALSO AS PREDATORS TO BE PREY OR EXCLUSION OR INCLUSION. CAGES
 ONLY AFFECT THE PHYSICAL ENVIRONMENT OR ATTRACT LARGE PREDATORS;
 MAY ALTER THE PHYSICAL ENVIRONMENT OR ATTRACT LARGE PREDATORS;
 CAGING STUDIES MUST BE CAREFULLY PLANNED & CAUTIOUSLY INTERPRETED.
 THIS PAPER REVIEWS PROBLEMS OF CAGING EXPERIMENTS ENCOUNTERED IN
 THESE DESIGN, FIELD, & INTERPRETATION STAGES. CONSIDERATION OF ALL
 THESE POTENTIAL PROBLEMS IS A NECESSITY FOR A SUCCESSFUL CAGING
 EXPERIMENT.

VIRNSTEIN, R.W. NO. 64
 1979. PREDATION ON ESTUARINE INFAUNA: RESPONSE PATTERNS OF COMPONENT SPECIES
 ESTUARIES 2(2): 69-86.

THE EFFECT OF PREDATION BY BLUE CRABS & FISHES ON ALL SPECIES OF INFAUNAL MACROBENTHOS OF A SUBTIDAL SANDY BOTTOM IN THE YORK RIVER VIRGINIA, WAS INVESTIGATED BY MANIPULATIVE FIELD EXPERIMENTS. WIRE MESH CAGES WERE USED BOTH TO EXCLUDE ALL LARGE PREDATORS FROM & TO CONFIN DIFFERENT PREDATORS TO SMALL AREAS OF THE NATURAL BOTTOM. AFTER 2 MONTHS, MANY SPECIES SHOWED SIGNIFICANT DIFFERENCES OF BETWEEN THE VARIOUS TREATMENTS. THERE WERE SIMILAR PATTERNS OF SPECIES RESPONSES IN THREE SEPARATE YEARS. SPECIES TENDED TO FIT ONE OF TWO CATEGORIES: THOSE SPECIES WHICH HAD TOUGH TUBES, WHICH LIVED DEEP IN THE SEDIMENT, OR WHICH COULD QUICKLY RETRACT MUCH IN INTO THE SEDIMENT WERE SHOWN EXPERIMENTALLY NOT TO CHANGE MUCH IN ABUNDANCE REGARDLESS OF WHETHER PREDATORS WERE EXCLUDED OR IN CLUDED. THESE SPECIES WERE GENERALLY THE NUMERICAL DOMINANTS IN THE NATURAL COMMUNITY--E.G. PELOSCOLEX GABRIELLAE, HETEROMASTUS FILIFORMIS, SPIOCHAETOPTERUS OCULATUS, & PHORONIS PSAMMOPHILA. OTHER SPECIES WHICH LIVED NEAR THE SURFACE OR EXPOSED ON THE SURFACE RESPONDED TO EXPOSURE. THESE SPECIES WERE EITHER UNCOMMON OR LARGE CHANGES IN DENSITY. ONLY SPORADICALLY ABUNDANT IN THE NATURAL COMMUNITY--E.G. POLYDORA LIGNI, STREBLOSPIO BENEDICTI, MULLINIA LATERALIS, & LYONSIA HYALINA. THIS EVIDENCE INDICATES THAT THE ABUNDANT SPECIES IN THE NATURAL COMMUNITY ARE ABUNDANT BECAUSE THEY AVOID PREDATORS.

WENNER, C. A., MUSICK, J. A.
1975. NO. 38
FOOD HABITS AND SEASONAL ABUNDANCE OF THE AMERICAN EEL, ANGUILLA
ROSTRATA, FROM THE LOWER CHESAPEAKE BAY.
CHESAPEAKE SCI 16(1): 62-66

FOOD HABITS & SEASONAL ABUNDANCE OF THE AMERICAN EEL, ANGUILLA
ROSTRATA (LESUEUR), WERE STUDIED FROM THE BRACKISH WATER REGIONS
OF THREE VIRGINIA RIVERS. ABUNDANCE IN TRAWL SURVEYS WAS RELATED
TO WATER TEMPERATURES WITH FEWER EELS BEING CAUGHT DURING THE MOST
COLDER MONTHS. POLYCHAETES, CRUSTACEANS & BIVALVES WERE THE MOST
IMPORTANT DIETARY ITEMS OF A. ROSTRATA IN BRACKISH WATER. THERE
WAS MUCH PREDATION ON THE COMMERCIALY IMPORTANT SPECIES MYA ARE
NARIA & CALLINECTES SAPIDUS.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Clarke, Douglas G.

Feeding habits and food of the fishes of Mississippi Sound and adjacent coastal areas ; a bibliography with abstracts / by Douglas G. Clarke, Harry L. Horstmann (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1981.

86 p ; 27 cm. -- (Miscellaneous paper ; EL-81-11)

Cover title.

"December 1981."

Final report.

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1. Coastal ecology. 2. Fishes. 3. Invertebrates.
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II. United States. Army. Corps of Engineers. Mobile
District. III. U.S. Army Engineer Waterways Experiment
Station. Environmental Laboratory. IV. Title V. Series:

Clarke, Douglas G.

Feeding habits and food of the fishes of Mississippi : ... 1981.
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Miscellaneous paper (U.S. Army Engineer Waterways
Experiment Station) ; EL-81-11.
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